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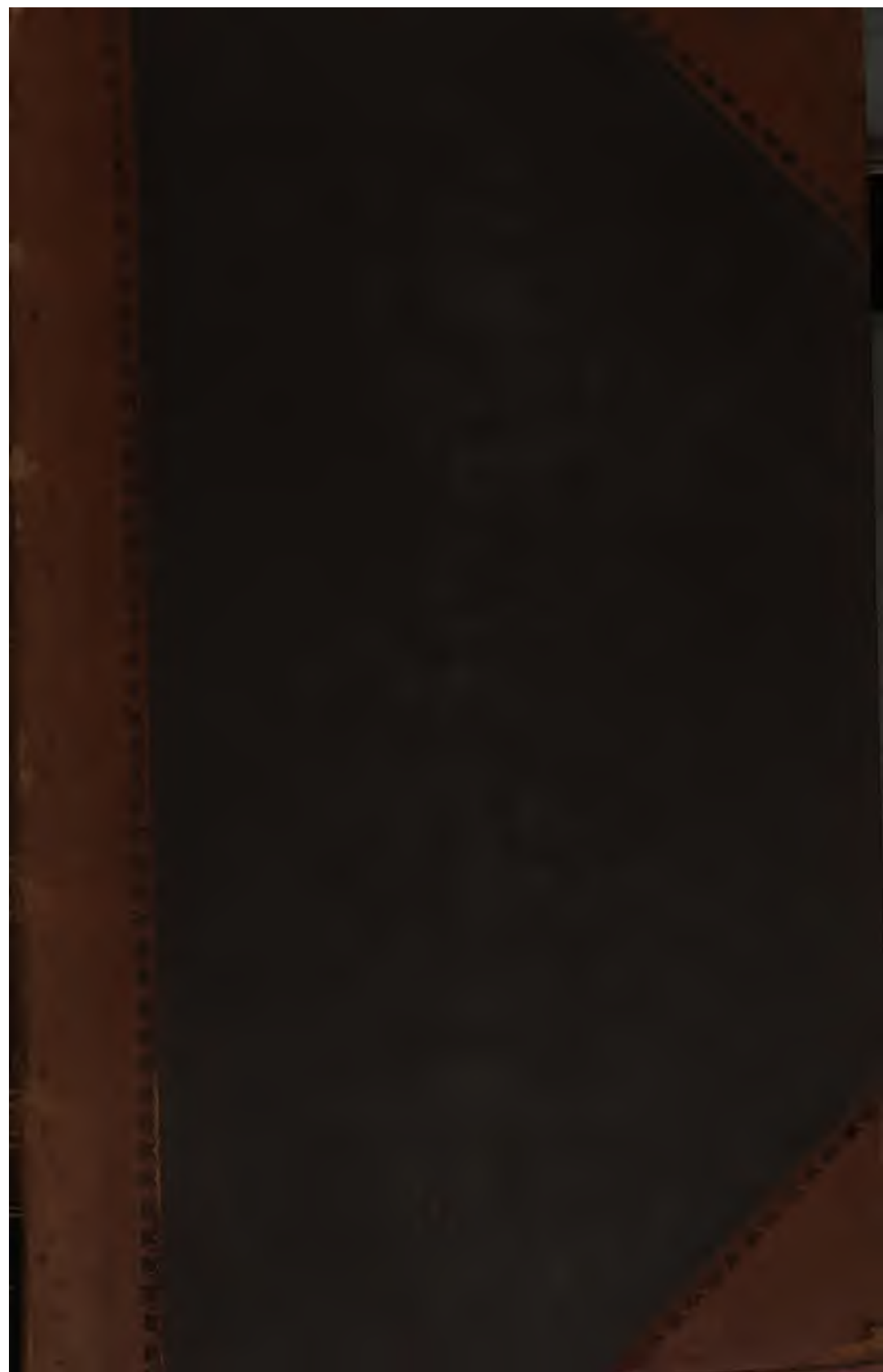
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HIPPOPATHOLOGY:
A
SYSTEMATIC TREATISE
ON THE
DISORDERS AND LAMENESSES
OF
THE HORSE;

WITH THEIR MODERN AND MOST APPROVED

Methods of Cure;

EMBRACING

The Doctrines of the English and French Veterinary Schools; the Opinions of
the late Professor Coleman, Director Girard, Hurtrel d'Arboval, and
other British and Foreign Veterinarians.

By **WILLIAM PERCIVALL, M.R.C.S.**

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VETERINARY SURGEON IN THE FIRST LIFE GUARDS;
AUTHOR OF "THE ANATOMY OF THE HORSE," "VETERINARY LECTURES," &c.

VOL. II.

"A righteous man regardeth the life of his beast."

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text notes that without reliable records, it is difficult to track progress, identify issues, and make informed decisions.

2. The second part of the document outlines the various methods and tools used for data collection and analysis. It mentions the use of surveys, interviews, and focus groups to gather qualitative data, as well as the application of statistical software for quantitative analysis. The importance of ensuring the reliability and validity of the data is stressed throughout this section.

3. The third part of the document provides a detailed overview of the results obtained from the research. It presents a series of findings that are organized into clear, concise sections. Each finding is supported by relevant data and evidence, making the conclusions more credible. The text also discusses the implications of these findings for future research and practice.

4. The fourth part of the document discusses the limitations of the study and the potential for future research. It acknowledges that while the study has provided valuable insights, there are still certain areas that require further exploration. The text suggests that future research should focus on expanding the scope of the study and incorporating more diverse perspectives.

5. The fifth and final part of the document provides a summary of the key points discussed throughout the report. It reiterates the importance of accurate record-keeping, the use of appropriate data collection methods, and the need for ongoing research and evaluation. The text concludes by expressing confidence in the findings and the potential for continued progress in the field.

HIPPO-PATHOLOGY.

INTERNAL DISEASE.

NO general fact appears better established in hippo-pathology than that disease is the penalty nature has attached to the domestication of the horse. So long as the unbroken colt remains at grass or in the straw-yard, even though he be houseless and shelterless, little apprehension is entertained about his health: no sooner, however, does the time arrive for his domestication, than from the day—nay, the very hour—he becomes stabled, do we begin to look for his “falling amiss;” and so prepared for this event do we feel in our own mind, that, should the animal escape all ailment during this probationary stage of his life, we are apt to regard him as a fortunate exception to what seems to be established as a law of nature. In removing the horse from the field to the stable—from a situation in which he has been exposed to the rude blast and pitiless storm—to one wherein the wind of heaven is hardly suffered to visit him, we have so circumstanced him that his condition—his capabilities—may be worked up to a truly exalted and matchless pitch of perfection; but the means we employ to effect all this are productive of unnatural excitement in his constitution, under the operation of which the probability—nay, all but certainty—is, that some part or other of the complex animal machinery will give way. As we render the hardy plant a tender one, although we augment its growth and beauty, by transplanting it from the open air into the hot-house, so we transmute the cool, sturdy temperament of the animal into a habit of irritability, and one that is both ready and apt, from comparatively slight causes, to take on inflammatory action.

In the first volume of “Hippo-Pathology,”* it has been my

* Already published by Messrs. Longman.

endeavour to shew, that the natural or necessary consequence of transporting a horse from a cold to a warm situation, and from poor to good living, is the engendering of *plethora* or fulness of blood, the tendency of which state of body is to inflammation, or eruption, "or breaking out:" the seat or site of inflammation or eruption being the part locally predisposed, or that happens to have blood attracted to it by some cause or other of specific irritation; which part, in horseman's phraseology, is said to "fly." The legs, as well on account of their remoteness from the source of circulation as from their dependent position, are by nature the first to "fly:" hence the proneness of young horses recently stabled to swelled legs. Exposed sensitive surfaces, such as the lining membrane of the nose, the windpipe, and the lungs, and also the delicate texture of the eyes, are likewise much disposed to "fly" or take on inflammatory action, not only on account of their exalted degree of innate sensibility and susceptibility, but from the excitement they are especially subjected to in the heated and contaminated atmosphere of the stable. We have only to extend the same train of reasoning to explain upon general principles the production of grease and farcy, catarrh, strangles, roaring, glanders, pneumonia, and ophthalmia; which, collectively, may be said to constitute the catalogue of disorders of young fresh-stabled horses.

THE ADULT AND WORKING PERIOD of the horse's lifetime is that in which, though seasoned and inured to his new domicile, he is still the occasional subject of disease; but his disorders have now become such as arise either from want or irregularity of exercise, or excess of labour, rather than from heat of stable or stimulating diet. Plethora, it is true, is manifest in his system; but the parts which in the young animal were too weak to resist its influence, have now gained strength, and no longer "fly" as heretofore: internal parts and organs, and particularly such as receive much blood, are now more likely to fail than those that are external and remote from the heart. The lungs will still continue very subject to attack because they especially suffer from over-exertion; but the brain and eyes will at this period be failing; the bowels also will now experience occasional disorder from the astringent nature of the animal's food, from the constipations they become subject to

for want of proper exercise, and from the disturbances caused in their functions by violent bodily exertion.

THIS DISTRIBUTION OF DISEASES between the growing and adult periods of a horse's lifetime will, of course, vary with the regimen he is subjected to, i. e., his stable management, the nature and quantity of the work he is made to perform, and other circumstances. The view I have taken of the subject is a *general* one: that the facts stated are worthy of some credit—whether the explanations coupled with them be plausible or not—will appear from the subjoined table:—

<i>A Table shewing the comparative Ages at which Horses appear most disposed to certain organic Diseases.</i>						
DISEASE.	No. of patients under 5 yrs. old.	No. in their 5th year.	No. above 5 and under 10.	No. 10 and upwards; but under 20.	No. 20 years old and upwards.	Totals.
Disease of the Lungs	170	50	20	50	10	300
Disease of the Bowels	10	20	40	70	20	160
Disease of the Brain	4	2	5	14	2	27
Disease of the Eyes.	30	10	70	35	5	150

From this tabular statement, to the extent that it goes, we learn that pulmonary disorders are more prevalent among horses prior to and during the fifth year of their age, the periods of their growth and domestication, than at any subsequent time; after that age that they become obnoxious to diseases of the bowels, and occasionally of the brain; and that ophthalmia is a disorder especially prevalent at the adult or most vigorous stage of life.

To enable us to pursue this interesting inquiry still further—to shew at what particular seasons, and months even, these disorders, respectively, prevail (though this is a matter necessarily greatly influenced by weather and situation),—I have, from “Re-

4 THE COMPARATIVE FATALITY OF DISEASES.

gisters of sick and lame horses" regularly kept for many years, drawn up the following table :

<i>A Table shewing the particular Months of the Year in which Horses appear most subject to certain organic Diseases.</i>				
MONTHS.	Disease of the Lungs.	Disease of the Bowels.	Disease of the Brain.	Disease of the Eyes.
	CASES.	CASES.	CASES.	CASES.
January.....	20	12	1	10
February	25	8	—	9
March	23	11	1	7
April.	19	10	6	10
May	13	3	3	9
June.	14	16	1	13
July.	13	13	3	19
August.	11	23	3	17
September	11	5	10	19
October.....	24	3	3	9
November	19	10	3	9
December.....	16	9	1	4
Totals.....	208	123	35	135

From this synopsis it appears that pulmonary diseases prevail most during the autumnal and winter seasons; that bowel complaints occur oftener in summer than in winter; and that this latter observation is still more applicable to disorders of the brain and eyes.

THE COMPARATIVE FATALITY OF DISEASES constitutes yet another link that may be usefully appended to this chain of inquiry. Searching for the deaths in one of the Registers from which the foregoing tables have been compiled, we find,

Deaths from Pulmonary Disease	77
Deaths from other Diseases (Glanders and Farcy and Accidents excepted).....	57

According to this calculation, pulmonary disease carries off more horses than all other maladies besides, setting glanders and farcy out of the computation. It must not, however, be understood that, because more horses die from pulmonary disease than from all or any other, *ergo*, in reference to the diseases themselves, separately considered, that it is the most fatal; on the contrary, pneumonia is not of itself so dangerous a disorder as enteritis; for were horses so obnoxious to one as they are to the other, more would certainly die from the latter than from the former. The predominance of pulmonary disease, among men as well as horses, is to be ascribed to the variableness of the climate we inhabit, and the continual vicissitudes we are all in consequence necessarily exposed to; against the effects of which it has been found next to impossible to protect our own bodies, much less those of our horses.

THE PROPORTION OF DEATHS in pulmonary affections is also to be elicited from an adjustment of these computations: it appears in the ratio of 77 to 300, or a fraction more than one in four*.

TREATMENT OF INTERNAL DISEASE.—The foregoing practical observations have been submitted with a view of throwing some light on the causes of disease in general, at least of those diseases to which the horse appears most obnoxious; the brief remarks that follow are intended to elucidate their treatment. Reasoning on general physiological principles, one would suppose that, in an animal in whom the pulse in health ranges under 40, the respiration is proportionately slow, and in whom the functions of the alimentary canal are so tardily carried on that we cannot insure the operation of a common purge under twenty-four hours, the progress of disease would likewise be slow; so far, however, is this from being the case, that there is no animal, probably, in which acute disease in general makes such fatal havoc in so short a time as in the horse. An attack of pneumonia has been known to kill in less than twenty-four hours: an enteritic paroxysm in half that time. Changes of structure are in like manner rapid

* The proportion of deaths to recoveries is probably too highly rated here, it being well known that cases of slight or incipient pulmonary disorder are very apt to become registered under the head of "Fever."

in taking place; and there is a prevailing disposition in the constitution of the horse to convert that which was originally cellular or vascular in its composition into a solid substance; and that which was uniformly solid, but still pliable and elastic in its nature, into a hard osseous substance, no longer flexible or even imcompressible. These preliminary general observations will, perhaps, suffice to evince the absolute necessity there is, in treating the acute disorders of horses, to at once have recourse to

REMEDIES PROMPT TO ACT AND EFFICACIOUS WHEN THEY DO ACT.—This property it is which places blood-letting at the top of our therapeutic catalogue, and at the same time renders it a measure to which we are in the habit of resorting so often, even in our ordinary course of practice. A surgeon can vomit his patient almost as soon as the emetic is taken; he can effect purgation in a couple or three hours: the veterinarian can accomplish neither;—at least, the one not at all, and the other but at a period when his patient (labouring under acute disease) is too far overcome, probably, to be recovered. Understanding these important distinctions between veterinary and human pathology and therapeutics, it will no longer remain matter of surprise, why in the one case blood-letting should be so much oftener practised than in the other. Independently, however, of the absolute necessity there mostly is for venesection in veterinary practice, there is still another reason why we, oftener than surgeons, are compelled to employ it; and that is, the consideration, on two accounts, that our patients should not lie long ill: first, because his services are required by his master, and cannot for any length of time be dispensed with; secondly, because expenses are going on for his keep, &c. although he himself is in a condition to earn nothing. These considerations it is which induce us to bleed in many a case that would recover quite as surely and as completely without blood-letting; but not in so short a space of time.

IN REGARD TO MEDICINE, bearing in mind how requisite it is in general that what we exhibit should take speedy and due effect, we should take care—at least in all cases attended with danger—to run no risk in prescribing as to the event; by which I mean, that in a case wherein we conceive purgation to be highly desirable,

it is our duty to insure, by proper dose and kind and form of medicine administered, the wished-for effect, without running the hazard of creating a necessity for a second dose, considering how long each dose requires to pass through the alimentary canal. Although this remark applies with more force to purgatives than to other medicinals, still it is one that ought not to be lost sight of in the ordering of any medicine in cases of disorder at all urgent.

EXTERNAL REMEDIES turn out of no use in acute or painful maladies, unless they exert greater action than, or make an impression superior to, the morbid one that is going on. The insertion of a rowel or seton, in a case where inflammation is raging with a rapidity which, if not checked in the course of a few hours, must prove mortal, is as futile in practice as piercing the ears of children for ophthalmia, or slitting dogs' ears for congested brain: the counter-irritant must be energetic, promptly and violently operative, to work any benefit in such cases.

DECISION IN PRACTICE is a faculty most desirable in any medical man: to the veterinarian it is often absolutely indispensable. A man who has a sick or lame horse must be informed by the practitioner he employs to administer to him, not only whether there be any probability of his dying, but, should his restoration appear probable, in what space the cure is likely to be effected, in order that he (the owner) may make a calculation in his own mind what the cost of keep, &c. will be during his servant's indisposition. But he is not satisfied even with this information; he must know, further, if the animal be capable of being restored to his pristine condition and powers; and if not completely, to what degree of approximation. I repeat, to answer all these inquiries with any degree of correctness and satisfaction, requires a man of penetrative and decisive judgment. Veterinarians have not to administer to the "mind diseased:" they have nothing to do with "placeboes:" their practice is an affair of cause and effect; they must be continually working either good or harm, and without, on the part of their patients (as far at least as their feelings are concerned), being made acquainted with which they are operating until the event has made it but too manifest.

SECTION VI.

DISEASES OF THE AIR-PASSAGES.

CATARRH, SIMPLE
 ———, FEBRILE
 ———, CHRONIC
 BRONCHITIS
 LARYNGITIS
 NASAL GLEET
 SCARLATINA

COUGH
 ROARING
 BRONCHOCELE
 POLYPUS NASI
 HÆMORRHAGE FROM
 THE NOSE

THE conduits for the air into and out of the lungs are the chambers of the nose, the larynx, and the windpipe and its ramifications, the bronchial tubes: altogether, these parts are comprised under the appellation of the *air-passages*. Similar parts, similarly connected, constitute the air-passages in man; but between man and horse there is this difference—that the one is able to respire through his mouth as well as nose, while the other can breathe but through his nose alone: the communication between the cavity of the mouth and the orifice of the windpipe being occluded by the soft palate, which in the horse is of extraordinary dimensions. To this fact, familiar as it is, I should say by no means sufficient importance had been attached in the consideration of the pathology of the air-passages. In consequence of the want of another outlet or entrance for the air, the nasal passages are in the horse made large and capacious, and from the circumstance of *all* the air respired having to pass through them, these passages necessarily become more under the influence of the aerial current—more obnoxious to any effluvia contained in that current—than the same parts are in man. Hence it is that catarrhal affections in the horse have their seat in the chambers of the nose in particular, and not in the mouth and throat, as in man; hence it is, also, that glanders is (or rather used to be) a common disease in the former, while in man, unless it happen by inoculation, the disorder is unknown.

The same difference of structure will, in a measure, serve to account for the extreme proneness of the horse to pulmonary af-

fections. The nostrils being large and widely open for the admission of air, the membrane lining the nose becomes so much the more exposed and subject to changes of temperature and to noxious effluvia in the air, whence it follows that inflammation is likely to be set up in some part of the nasal membrane, and from that part creep down the windpipe and settle upon the lungs.

This membrane being so very subject to disorder, and being the seat of catarrh, of cough, of glanders, of roaring often, and sometimes of inflammation in the lungs, well deserves our particular attention and (to the extent that we are able to examine it) frequent inspection. On opening either nostril we discover its surface displaying a dotted, shining, humid aspect, of a more or less carnation hue, without any collected mucus upon it, that being one of the earliest indications of disorder in it. It is a part we should never fail to examine in passing a horse in regard to soundness: it is a part which calls for our especial examination in all the cases comprehended in the class of "Diseases of the Air-Passages."

CATARRH.

DERIVATION.—*Catarrhus*, from *καταρρέω*, *defluo*, I flow down.

SYNONYMY.—A cold, a defluxion, a discharge or running at the nose.

DEFINITION.—A sero-mucous defluxion from (commonly) both nostrils, increased redness of the Schneiderian membrane, oozing of tears from the corners of the eyes, swellings underneath the jaws, snorting, cough, with or without febrile disorder.

THE VULGAR AND VAGUE APPELLATION OF "COLD" has, among professional men, very properly given place to the more definite and intelligible one of *catarrh*. Hardly any two persons attach the same meaning to the word *cold*: both surgeons and veterinary surgeons are so often misled by it, that nothing short of actual inspection of the case can or ought to satisfy the medical adviser. A groom will report to his master that his horse has "only a cold," when the animal is probably labouring under an attack of bronchitis or pneumonia; and will declare a paroxysm of specific ophthalmia to be but "a cold in his eye;" and do this, not from any desire to

conceal the truth, but from a confident sense of the rectitude of his judgment. Many a life, and still more eyes, have been lost from medical aid being deferred or kept aloof after this specious manner.

CAUSE.—The appellation of “cold” for this disorder has evidently sprung from the circumstance of its production being commonly connected with exposure to diminished temperature: though cold seems oftener but the *predisposing* cause, the ordinary excitant appearing to be *heat*. It is not common for horses that are turned out, even though exposed to every inclemency of weather, to take catarrh; but very common after they have been taken up and put into stables, and especially when the stables prove to be warm ones. It is oftener the transition from cold to heat than from heat to cold, that generates catarrh: in a general way, horses may be taken out of their warm stables and turned into cold situations (provided they are not exposed to wet) without any thing like the risk incurred from the reverse treatment. I must differ, however, with Professor Coleman—should he still hold the opinion—that horses *never* suffer from exposure to cold: I have seen many instances of catarrh (not to mention other diseases) consequent on turning horses from warm stables into cold pastures or strawyards. Still, the ordinary subjects of catarrh are horses three, four, and five years old, passing from the dealer’s or breeder’s hands into warm stables; and particularly during wet and cold springs and autumns. In some years catarrhal affections become so generally prevalent, and in their attack manifest so much more than ordinary severity, spreading so rapidly among young horses, that the disorder not only assumes the character of an epidemic or influenza, but has the appearance of being contagious; and though I have never had reason to regard it as such, yet have I deemed it prudent to separate such patients as emitted fluxes, inordinate either in quantity or quality, from knowing that, every now and then, one among them will turn to glanders. In former veterinary works we find catarrh ascribed, above all other causes, to “obstructed perspiration.” In old horses, and such as are at their work, no doubt, like cold, it is an occasional cause; but the ordinary subjects, I repeat, are young horses—horses that have not yet commenced work, and that are not consequently often sweated. Horses whose

skins have become wet, either from having been sweated or washed, and are afterwards suffered to grow dry without being rubbed, will, particularly in cold weather, be likely to take a cold or shivering fit. The same observation may be made in regard to a horse allowed to stand in any situation where he is exposed to a current of air. But in many of these cases heat will be found to have supervened before the inflammatory disorder manifests itself.

FOUR KINDS of catarrh :—*simple*, when void of fever; *febrile*, when attended by fever; *chronic*, when of long and tedious duration; *epidemic**, when attacking many at one time, and accompanied with remarkable prostration of condition and strength.

THE SYMPTOMS of simple catarrh are, a watery distillation, accompanied with, or else quickly succeeded by, a defluxion of flakes of mucus from both nostrils—rarely from one alone; some slight humid blush of the Schneiderian membrane, oozing of tears from the corners of the eyes, with globules of mucus observable in them; small, loose, diffuse swellings under the jaw; occasional snorting, perhaps coughing too; but without depression of spirits or loss of appetite.

FEBRILE CATARRH may be either *slight* or *severe*. When slight, it is nothing more than the simple form, accompanied with some unusual dulness and fastidiousness of appetite, and some little fever: and this is the ordinary form in which catarrh presents itself. The severe form is that in which the depression is greater, the appetite nearly or quite lost, the fever comparatively high,—the reddening will be greater, and there will be turgidity also of the Schneiderian membrane. Its surface will either appear quite dry, or there may be a scanty, yellowish, albuminous fluid, turning afterwards into a thick muco-purulent running, and becoming altogether as abundant as it was at first sparing. The glands under the throat will swell considerably, and evince tenderness on being felt or compressed; those below the roots of the ears will likewise become tumid, giving rise to what grooms call “the coming down of the kernels.” Cough is commonly present, and in some cases sore throat. In a few cases so extensive

* Already described in section 3, vol. i, of Hippo-pathology.

and violent is the inflammation in the membranes of the nose and throat, and so abundant the discharges from them, that embarrassment is occasioned in respiration, which may increase to that degree to produce violent and convulsive fits of coughing, and even to put the animal in danger of suffocation unless relieved by the operation of bronchotomy. This, however, is what rarely happens, save in the epidemic variety of catarrh.

THE DURATION of an attack of catarrh is ordinarily from one week to three. Should it not appear to be on the decline about the third week, we may infer that the disorder is becoming *chronic*, in which form its duration cannot be said to have any definable limits.

IN CHRONIC CATARRH, the nasal defluxion it is which constitutes the prominent and troublesome symptom: indeed, it is often the only one remaining. Sometimes the matter is yellow, from the admixture of pus with mucus; at others, it is altogether as remarkable for whiteness, and possesses a clotted or grumous character: in a few cases it consists of an opaque, thin, dirty-looking mucus. In general these chronic cases "run themselves dry," as the phrase goes; though every now and then we meet with one degenerating into *nasal gleet*, an affection I shall consider hereafter.

THE TERMINATION of catarrh, taking its ordinary course, is in the return, more or less speedy, of health. At such times, however, as it manifests more than usual severity, and particularly when much inflammation and stoppage in the cavities of the nose and throat are indicated, there is great reason to apprehend its running into bronchitis, in which extended and modified form it becomes pregnant with all the dangers of an inflammation in the lungs. Many a horse has changed hands having at the time a simple "cold," which in his new owner's possession has run into an attack of bronchitis; from which, should he escape with his life, there is still great risk of his becoming a roarer. Catarrh may prove but the precursor of strangles. But again, cases do occur, though happily for us but rarely, wherein the disorder, after having run its course, and all signs of inflammatory action having subsided, leaves a discharge from one or both nostrils, to which we have given the name of *nasal gleet*; and the appella-

tion is applicable enough, so long as the defluxion presents nothing beyond the catarrhal character: from the moment, however, that it loses this, and especially when it has turned to a thick, turbid, dingy-looking mucus, clinging to the nostrils of the horse, and sticking with gluey tenacity to the fingers of the person inspecting them, we must—should we not have done so before—take care to remove the animal into a stable or box apart from other horses; and, at the same time, advise his owner of our suspicions of his ultimately becoming glandered. This, however, is a part of my subject which cannot be thoroughly understood until the disorders, “nasal gleet” and “glanders” come to be considered.

PROGNOSIS.—Of itself, a catarrh is an innocuous painless disorder, often so mild as hardly to call for medical interference, and never resisting such counter-agency for any very long period of time. It is only from its *sequelæ* that adverse results, and occasionally even fatal consequences, are to be dreaded: I mean bronchitis and roaring, nasal gleet and glanders.

PATHOLOGY.—Observations in this field of veterinary practice are well calculated to throw a light upon one or two extremely interesting and still disputed points touching the cause and nature of catarrh in general. I have already endeavoured to shew, from results of every day occurrences, that the disorder among horses arises oftener from heat, than from cold; and yet from the circumstance of that heat acting in combination with miasms generated in situations where horses are congregated, it may be difficult, in many instances, to discriminate between the effects of heat and of this insalubrious condition of the atmosphere. In very foul situations, we have not only cases of catarrh occurring, and those of unusual severity, but we meet with cases of glanders and farcy, and ophthalmia: clearly evincing that at least these latter diseases are attributable to the impurities of the atmosphere, which are at all times rendered more influential by the accompaniments of heat and moisture. We cannot demonstrate that inflammation is present in every case of simple catarrh or defluxion; but when it is, I see no reason for viewing it otherwise than as common phlegmon: though in cases of scarlatina, and some

forms of influenza, the appearances the membrane assumes, together with the products from it, are such as to induce us to a different conclusion. The seat of catarrh is the Schneiderian membrane, and in particular that portion of it enveloping the *septum nasi*. From this it mostly extends to that part covering the turbinated bones, in which situation it is apt to occasion some degree of stoppage in the nose, arising either from tumid condition of the membrane, or from augmented secretion. Should it extend to the fauces and larynx, the consequence will be sore throat. In the windpipe and its branches—throughout which the same membrane is continuous—it will give rise to the disease called *bronchitis*. The frontal sinuses are likewise in the way of becoming affected, and inflammation in them, no doubt, would occasion head-ache, manifested by unusual dulness or heaviness: further than this I am afraid we know but little about this form of catarrhal disorder.

THE TREATMENT of catarrh is in general a very simple affair; consisting rather in what French physicians have styled *médicine expectante* than in any active remedial measures.

FOR A SLIGHT CATARRH, take the horse out of his warm (perhaps foul) stable, or from any cold or wet situation in which he may happen to be, and turn him loose into a box of the temperature of 55 deg. of Fah., and take care that he has an ample bed, clean, dry, and free from impurities. In cold weather clothe him warmly, and, if required, flannel-bandage his legs. Give him nothing to eat for the first two days but sloppy bran-mashes, and let him have linseed tea or gruel, or chilled water, to drink, a pailful of either beverage being hung up within his box, of which he may partake at pleasure. Encourage any flux there may be from his nostrils by steaming them twice or thrice a-day with scalded bran, in a hair nose-bag. Should he have any cough or soreness of throat, let his throttle be rubbed with the turpentine liniment, made thus:—

Take of Soft soap one ounce
 Camphor, half-an-ounce
 Oil of turpentine, eight ounces

shaken together until they be mixed.

Should the excrement prove hard and dark-coloured, an enema of soft soap and tepid water is to be given, and repeated daily until

it become of a pultaceous consistence. Purgation is inadvisable, and therefore I abstain from giving aloes; the only medicine I give, if any, is a ball composed of

Potassio-tartrate of antimony, ʒj
Nitrate of potash, ʒiij
With honey or treacle sufficient.

Some veterinarians are in the habit of giving the spirits of nitric æther in one or two ounce doses in gruel, twice or thrice a-day.

IN SEVERE CATARRH, and particularly when there is much accompanying fever, blood-letting is practised with advantage; though even in this case, the soothing and privative mode of treatment will in time work a cure. But blood-letting shortens the ailment, and often proves of service in preventing any serious extension of the inflammation. Should the pulse run high after bleeding, nauseate with scruple or half-drachm doses of white hellebore-root; but do not repeat the ball oftener than twice a-day, and take care to narrowly watch its effects. Keep the bowels soluble by injections, and continue the gruel or linseed drink, and the bran-mash. Boiled carrots, turnips, potatoes, scalded oats, malt-mash, fresh grains, and, in summer, green meat of all kinds, are all proper, and particularly during convalescence.

PREVALENT SORE-THROAT AND TROUBLESOME COUGH are to be relieved—should the turpentine liniment prove unavailing—by the application of a blister to the throttle, or, what in urgent cases is most speedily effectual, a mustard-plaster, which may be sponged off after an hour's time, and by so doing the hair and skin preserved.

FURTHER OBSERVATIONS.—No exercise is to be allowed: on the contrary, let quietude be enjoined. There are cases in which steaming the nostrils is apt to create irritation and much annoyance, which would be a sufficient reason to omit this, in general, very beneficial practice. In respect to rowels under the jaws, and setons through the skin of the throttle, I am of opinion that they are not adapted to recent cases, or those in which any very active inflammation or fever is manifested; but to such cases alone as come under the denomination of *chronic*, and, as such, are likely to prove tedious and of long duration.

BRONCHITIS.

DERIVATION.—From *βρόγχος* and *itis* : literally, inflammation of the throat. A disease so called from its seat being the bronchial tubes.

SYNONYMY.—In old works on farriery we find what we consider to have been this disorder called *morefoundering*, a word derived from the French appellations, *morfondement*, *morfondure*. By old writers on human medicine the disease has been described as *peripneumonia notha*, from its having been regarded as a sort of false inflammation of the lungs. Of late years it has got the name of *pulmonary catarrh*, which we have no less authority than the great Laennec's for preferring to the one—in compliance with custom—we have adopted above.

KINDS.—Bronchitis may exist either by itself or at the same time with another disease, in which latter case it is said to be *complicated*. In either case it may be *acute* or *chronic* : in the complicated form it may, in reference to the disease with which it co-exists, be either *primary* or *secondary*. Moreover, it may be *epidemic*.

The CAUSES of catarrh are the causes of bronchitis. The same membrane pervades the air-passages ; and though from its situation within the lungs it is less exposed than within the head, still is it much under the influence of atmospheric changes and noxious inhalations. Independently, however, of these causes, there are others which in a peculiar degree operate upon the bronchial membrane. It is well known that this membrane, vast in its superficial extent, is closely allied in its function of secretion with the skin ; and not with the skin alone, but with other mucous membranes of the body as well, particularly the one lining the alimentary canal. Cold or wet suddenly applied to the surface of the body, especially when heated, checking or suppressing perspiration, will be likely, on the principle of derivation, to throw an inflammation upon the bronchial membrane. A disordered state of the bowels may induce the same by sympathy. It is this known sympathy between the two membranes which deters us from giving aloes or any thing likely to irritate the bowels in bronchitis : being

certain to be troubled with diarrhœa if we do. In addition to all this, bronchitis may be caused by other disease, and especially of the lungs or pleura. Moreover, it is a common accompaniment of epidemic catarrh. It every now and then supervenes upon strangles.

THE SYMPTOMS of an attack of acute bronchitis vary commonly in their nature, as well as intensity: in an ordinary case they are as follow:—the horse manifests dulness and defective (rarely complete loss of) appetite, accelerated pulse, skin and legs rather warm than cold, mouth warm and moist, Schneiderian membrane reddened. He coughs occasionally, hard and dry, and probably evinces some soreness about the throat. Next, his breathing becomes disturbed, short and quickened, but neither deeply nor painfully drawn; and occasionally accompanied with a sort of rattle or sighing noise. Either there is no flux whatever from the nose—in which form the disorder is called *dry catarrh*, rather a contradiction of terms—or else there is a scanty exudation of thin aqueous fluid, or of a glutinous yellow-looking thick matter. As soon as the inflammation begins to abate, the flux from the nose becomes augmented and turns of a mucous character. The pulse averages from 60 to 70, and is in general soft, and at the jaw not very perceptible; and yet it will bear repeated abstractions of blood before it will give way.

THE EPIDEMIC VARIETY of bronchitis is remarkable for the emission of copious fluxes from the nose, at one time turning yellow, at another green, and then again white. In this form the disorder is exceeding apt to assume the chronic type, and, after continuing for a length of time, to leave the animal reduced in flesh, and much debilitated.

CHRONIC BRONCHITIS now and then succeeds the acute; oftener however in its epidemic form than otherwise. At times it is of itself an idiopathic disease. In some old horses we meet with what is called “chronic cough”—a cough resembling a sound emitted from some deep cavern, occasionally accompanied with shortness of breath, and a discharge of sero-mucous matter from the nose, which is augmented in the act of coughing. Added to these symptoms, should a wheezing noise or *râle* be detected by the ear

in the bronchial passages, we may safely set the case down as chronic bronchitis.

PROGRESS.—The malady in its acute form attains its height commonly about the fourth or fifth day, and after the sixth or seventh begins to decline, leaving the patient out of danger at the expiration of the tenth or twelfth. Should the case not go on favourably, however, about the fifth or seventh or ninth day we may look for dissolution. The signs of growing worse are, the respiration becoming oppressed, the pulse quicker and fainter; the skin and extremities cold; the mouth cold and clammy; and the nostrils dry, lacking any moisture whatever.

THE PATHOGNOMONIC SYMPTOMS of bronchitis are nasal flux, with reddening of the Schneiderian membrane, cough, sore throat, dyspnoea. Auscultation will assist us in our diagnosis. In place of the natural, soft, and all but inaudible *murmur*, we shall perceive a distinct sound, a cooing sort of noise, arising from want of secretion within the tubes. When the secretion returns, and in augmented quantity, we may be able to detect the *râle* or rattle as it is called. These sounds will, of course, be present only in places where the disease is present; and in one or both lungs, according as the case may happen to be.

THE PROGNOSIS is in general favourable. Bronchitis is dangerous only when the secretions clog or obstruct the tubes—or in its

COMPLICATED FORMS, when combined with other disease of the lung, with pleurisy, and especially with disorder of the mucous lining of the alimentary canal. In this latter case, in combination with diarrhoea, and when the inflammation is running high in the bronchial membrane, there is hardly a chance of saving the animal.

PATHOLOGY.—Veterinarians have continued too long in the error out of which even human surgeons have not many years emerged; viz. the mistake of confounding bronchitis with peripneumony, and calling both by one name, *inflammation of the lungs*. It is true, the bronchial tubes constitute part of the lungs; but then, inflammation seated in a mucous membrane must be regarded in a different light from inflammation in cellular tissue, such being the nature of the parenchymatous substance of the lungs, as well as dissimilar from any congested condition of the large pulmonary bloodvessels.

The inflammatory attacks of the lungs to which young horses are so especially obnoxious, are, for the most part, cases of bronchitis; and even of such as are peripneumony, bronchitis is a common precedent or accompaniment. In fact, there hardly exists any organic disease of lung in which bronchitis is not present, either in a primary or secondary form.

THE TERMINATIONS or consequences of bronchitis are such as to make us anxious to institute such treatment at its commencement as is most likely to lead to their prevention; it being, of all others, the most fertile source of those organic changes which in particular tend to shorten or impair the animal's wind. Roaring and thick wind commonly have their foundation laid in bronchitis. The bronchial membrane during the early stages of disease will be found in a state of congestion or turgescence; in the sequel it is very likely to become thickened in substance—*hypertrophied*, as it is called—in which condition the calibre of the bronchial tubes, the small ones in particular, will suffer considerable diminution, and consequently become but comparatively imperfect conductors of the respired air. In the larger tubes the lining membrane is furnished with follicles; and, in fact, has the true mucous character; but in the very small ones, as we approach the air-cells, it has been found to bear more similarity to a serous membrane, and on this account becomes still more disposed to take on the plastic or adhesive kind of inflammation, which not only gives rise to hypertrophy, but occasionally to solid effusion and agglutination of the sides of the tubes, obliterating their cavities, and converting them into mere chords, the same as happens when inflammation is set up in the interior of bloodvessels; and this may even go so far as to block up and annihilate the air-cells. The effect of this will be to shorten or “thicken” the wind, to compensate for which the animal will make additional efforts in respiration, and the result is likely to be *dilatation* of the vicinous tubes and air-cells. It would appear that this process of obstruction commonly commences in the smaller and makes way into the larger tubes, and from the circumstance of secretion having been found pent up in the air-cells while the tubes were in a state of obliteration, and assuming that sort of aspect which tubercles and vomices are known to give the lungs,

Mr. Stokes* has ingeniously hinted that this "will go far to clear up the controversy about the nature and origin of tubercles." In acute attacks of pure bronchitis in young and otherwise healthy horses, dissection has brought nothing to light but a reddened and turgescient or thickened state of the bronchial membrane, the tubes themselves being filled with a quantity of frothy mucus, appearing as if the animal had been actually choked by it, or, as Dr. Elliottson has pertinently expressed it, "drowned inwardly by mucus."

TREATMENT.—Although blood-letting is the remedy upon which our chief reliance must be placed for the cure of bronchitis in its acute form, yet it is one I do not recommend the practice of in mild cases, nor even in others until the disease has quite set in. I do not find that its very early employment tends much to shorten or mitigate bronchitic affections; although it becomes highly serviceable as soon as the disorder begins to manifest any severity; and whether we bleed in the very beginning or not, we shall certainly be compelled to have recourse again to the phleam about the third or fourth day. The quantity of blood to be drawn must be such as will cause the pulse at the jaw to fail under the embrace of the fingers: about a gallon will ordinarily accomplish this in young horses: in horses five years old and upward, more may be required. In some low-conditioned subjects three quarts may suffice. Should the pulse and dyspnœa and fever not become palpably diminished by one blood-letting, a second may be employed after twenty hours' interval; also a third, and even fourth, as the case may happen to be; taking care, in the epidemic form of the disorder more particularly, that these evacuations be small, and cautiously practised after the fourth and fifth days have passed. The bowels must be kept soluble, but not by aloes. Indeed, I am afraid we possess no medicine mild and safe enough to accomplish this desirable end, and therefore we must effect our object by enema, and, fortunately, we can always succeed in this manner quite to our satisfaction.

The well-known sympathy existing between the membranes of the bronchial and alimentary tubes, and the consequent morbid irritability of the latter whenever the former is in a state of inflam-

* In his "Treatise on Diseases of the Chest."

† Dr. Elliottson's Lectures.

mation, is the reason for this positive prohibition of aloes; a medicine drastic and irritative in a high degree to the mucous surface of the intestines, and one that has in numerous instances in this complaint brought on a diarrhœa, which has annoyed and debilitated the animal without in the least diminishing his bronchial disease, while at the same time it has prevented the practitioner from necessary abstractions of blood, and induced him to give medicines either for its mitigation or suppression, such as could not fail to do harm in another way. I feel persuaded that many horses have been lost after this manner, thus evincing that aloes, although a medicine capable of doing more good than any we possess, still is one with which we may, even in small doses, work an incalculable deal of harm.

To the question often asked—if one is not to give aloes, what ought one to give? I answer, give any thing but aloes; rather give nothing at all. Give either hellebore or digitalis in half-drachm doses, once or twice a day: I prefer the former, because it nauseates quickly, and because the latter is apt for some considerable time to take no apparent effect at all, and then all at once to come into dangerous operation. Or tartar emetic and nitre may be given.

As soon as our abstractions of blood have had the effect of lowering the power of the pulse, and abating the febrile excitement, the dyspnœa, and heat of mouth in particular, we may begin to think of counter-irritation: the practice of blistering and rowelling while inflammation is running high is quite futile and useless, for no sort of effect will be produced: the very fact of blisters rising and rowels discharging being a proof of the decline or remission of inflammatory action. In cases at all urgent a blister should be applied to the breast; that being a situation in which it will most readily take effect, even when no impression can be made upon the sides. Should it be deemed advisable to stimulate the sides as well, mustard embrocations will be found preferable to cantharides. A rowel may be inserted in the breast in any case wherein, from its slightness or subacute nature, and consequent tendency to the chronic form, it is not thought worth while to inflict the pain and temporary

blemish of a blister, and wherein it is of consequence that counter-irritation should be kept up for some time.

Towards the close of the case, at the time that the disorder appears to have exhausted its inflammatory tendency, and manifests effects of loss of condition and debility, it may be proper to commence a course of tonic medicine, which it is highly advisable should have some diuretic ingredients in order to prevent or counteract any disposition to dropsical effusion that may be left behind. In such cases as this also great benefit may be expected from local derivatives, such as issues in the form of plugs, rowels, or setons.

In such cases as assume the chronic form, even though they be mild in their character, yet at the time that febrile excitement is present, a small blood-letting will often prove very serviceable. And from counter-irritation more is to be expected than when the disorder is acute. Should there be much flux from the nose, giving the disorder the character of nasal gleet, such medicines may be administered with a view of checking or suppressing it as will be found recommended in my description of this latter complaint.

LARYNGITIS.

DERIVATION.—From the Greek primitive *larynx* and *itis*; meaning together *inflammation of the larynx*. Strictly speaking, this implies that the inflammation is confined to the larynx, to the exclusion of other parts: in practice, however, this will but rarely be found to be the case; catarrh is a common accompaniment, and a still more common one is bronchitis.

KINDS.—Laryngitis may be *acute* or *chronic*: the former is almost always complicated with other disorders; the latter appears, in many instances, to exist by itself.

THE SYMPTOMS of acute laryngitis—or that form of inflammation of the air-passages in which the larynx is the principal seat of disease—are such as are strongly characteristic of the complaint, and, in its worst forms, such as are calculated to create much alarm, even for the life of the patient. The respiration is short, difficult, and painful, and every breath is attended with a peculiar hoarse sound in the throat, manifesting soreness and impediment about

that part, which evidently arises from the tumid and morbidly sensitive condition of the membranous lining of the glottis. This soreness of throat causes the animal to carry his head projected, and with stiffened neck: it is also attended with a difficulty of swallowing, which makes the horse averse to take hard prickly food; or it may cause him to cud his hay. Under these circumstances we shall find not only the larynx affected, but the pharynx as well, and also the nasal passages and sinuses, together with the various glands in the vicinity,—the parotid, sublingual, and submaxillary,—all which in the sequel may end in abscess either of the guttural pouches or of the submaxillary substance, giving the case the appearance of strangles.

The laryngeal membrane, particularly that portion of it which covers the glottis, is subject to become changed from the endurance of inflammation: it gets infiltrated, dropsical, and, at length, permanently thickened, and, perhaps, indurated; it is also subject to become ulcerated, a state which has in no few instances been an accompaniment of glanders.

A troublesome, short, hard, dry cough accompanies the disease in its early stage, but as the inflammation increases the cough grows hoarse and feeble; and under extreme tumefaction and soreness of parts becomes altogether suspended. Did not the peculiar noise and impediment in the breathing observable in the throat discover the true nature of the disorder, the slightest compression of the throttle will not fail to detect that characteristic soreness and irritability of the larynx which can leave no doubt of its presence. In the beginning there is commonly no nasal defluxion; but towards the decline of the inflammation the nasal secretion returns, or, what is often the case, the laryngeal secretion is coughed up, mingled with an inordinate flow of saliva.

Fever also is sure to be present when the animal is suffering much, whether the irritation proceed from the intensity of the inflammation, or from the pain and impediment occasioned in the respiration and deglutition.

CHRONIC LARYNGITIS is a disease that comes oftener under our notice than the acute form. I believe most of the troublesome, enduring, hacking coughs we have such constant complaints about,

to be attributable to some over-irritable or sub-acutely inflamed condition of the larynx: at least, I think, we have a right to assign that as their seat when we find compression of the larynx instantly occasioning the cough, and causing that resistance—shaking of the head, running back, &c.—on the part of the animal, which clearly enough evinces unnatural irritability in the part. Another demonstration of the truth of this opinion, is, the relief mostly obtained from the application of a blister to the throat.

THE CAUSES of laryngitis may be sought for among those of bronchitis.

THE EFFECTS of this inflammation are various, tending in violent cases to suffocation; in others, to that state of parts which is known to produce thick wind or roaring. Suffocation is liable to happen under convulsive efforts to breathe, either during the tumid infiltrated condition of the mucous membrane, or while the passages are loaded with secretion: it is under these circumstances that we are warranted in having recourse to the operation of bronchotomy.

THE TREATMENT of laryngitis is to be the same as that adopted for catarrh and bronchitis, with this exception—that the throat must be the part to which all local means are to be directed. In mild cases we may be content with fomentation and poultices, succeeded or alternated by some stimulating embrocation; but in violent and dangerous cases nothing is so effectual as the mustard embrocation. In all ordinary cases, and particularly where there is any disposition to become protracted or chronic, nothing tends to bring about a crisis of some sort sooner than a blister.

NASAL GLEET.

By nasal gleet I wish to be understood to mean those discharges from the nose which are commonly preceded by some inflammatory attack of the air-passages; though, in some instances, they make their appearance without any such discoverable precursor, and in most cases are apt to continue long after all signs of inflammation have died away. Gleet is more likely to be left after a chronic than an acute attack of inflammation, and to appear in an adult or aged horse than in a young subject. Sometimes the dis-

charge comes from one nostril, sometimes from both. Sometimes the submaxillary glands are tumefied; sometimes not. The Schneiderian membrane on inspection presents no remaining traces of inflammation: its surface has grown pallid or leaden-hued, and is free from all pustular or ulcerative indication. The quality of the matter discharged varies in different individuals; and even in the same individual, often, at different times. The common gleet consists of a particularly white mucous matter, about the thickness of cream, which in some cases is smooth and uniform, in others clotty or lumpy. At one time the discharge collects at the nostrils, and is ejected in flakes or masses in pretty regular succession; at another there is a good deal of irregularity in this respect, the running ceasing altogether for awhile, and then returning in double and treble quantity. This short account of the subject before us must suffice for the present: only let it be understood that it is *not glanders* we are considering; though I feel no hesitation in adding, that many such cases have been so regarded, and condemned accordingly. It may not in every case be in our power to pronounce between the malignant and the harmless disorder, but it is in the majority; and under almost all circumstances it becomes our duty when it is not, to treat the case, and await the issue. I shall resume the subject when on glanders.

Delafond gives the following account of expectorated matters or discharges from the nose in horses:—

At the onset of bronchitis and acute pneumony the expectorated matter consists of serous mucus, ropy, and at times reddish. In chronic bronchitis the discharged matter is whitish, curdled, lumpy, and floating in serosity; in pulmonary emphysema it is clear and slightly viscous; in laryngitis, yellow, thick, flaky, coming away in detached masses, streaked with red; grey, opaque, and of a dirty hue and offensive odour, in cases of chronic pneumony; corrupt, and of the colour of wine-lees, and mixed with black-looking excretions, in gangrene of the lungs.

THE TREATMENT I have found of most avail may be described under three heads:—counter-irritation, local applications, and the exhibition internally of such medicines as are known to have some astringent or styptic operation upon the mucous membranes of the body. Counter-irritation comprises blisters, rowels, and setons. Did there exist any submaxillary tumour, I would apply

a blister upon it; otherwise I should prefer the insertion of a rowel underneath the jaw. I have known the anterior part of the face to be blistered; to this I object, both on account of the annoyance it gives, and the disfigurement that is apt to follow. Setons in the same situation seem less objectionable. The injections mostly used are solutions of alum, copper, zinc, lead, lunar caustic, &c. They should be made weak at first, and have their strength increased by degrees afterwards, the object being to stimulate, not erode, the surface. I have on several occasions employed fumigation, and various medicaments in the gaseous form; but I cannot say I ever have experienced any great deal of benefit from them: in general I have found more efficacy in simple injections. The medicines that have appeared in my practice to have taken most effect, given internally, are preparations of copper and barytes, copaiba, cantharides, and the cubebs and Cayenne peppers. That which exerts the most speedy and decided operation is the balsam of copaiba: like all the others, however, it cannot be implicitly relied on; in some cases it will in a few days cause the discharge to cease, in others no such effect will follow its administration. I am in the habit of giving it in ounce doses, rubbing as much linseed meal or oatmeal into an ounce by measure of the balsam as the latter will take up, and making the mixture into one or two balls, and giving this dose morning and evening at first, and, after three or four days, thrice a-day, according to the effects produced. Cantharides may be given, to begin with, in five-grain doses twice or thrice a-day; or it may be advantageously introduced into the copaiba ball. Both cubebs and Cayenne peppers possess stimulant and styptic powers upon the mucous membranes: the former may be given in ounce doses, mingled with copaiba; the latter in half-ounce doses, with the same, or with common Venice turpentine. Both the sulphate of copper and muriate of barytes have proved useful in these cases: the first stands handed down to us by our professional ancestors as one of the remedies they employed in various disorders more than most others; the other I can speak of from my own experience. Whether either of them possess any anti-glanderian virtue, will be matter for future inquiry: at present I shall only say, I believe that this preparation of copper is one of the most efficacious medicaments we have in regard to some

anomalous affections of the air-passages, and that, as such, it will often become our duty to give it a trial in such cases as appear to be but simple nasal gleet. I believe its operation to be greater in small doses long continued than in large doses; and that it is better, both for the stomach and its introduction into the system, that it should be exhibited in the form of solution. In regard to the muriate of barytes, it may be most conveniently administered in the water the animal drinks. More particular directions will be found under the head of glanders.

SCARLATINA OR MORBILLOUS DISEASE.

The disease I am about to describe bears an analogy to the eruptive diseases, scarlatina and measles, in the human subject: whether that analogy be sufficiently strong to warrant the introduction of one of those names for it, must be left to future observation to determine. The first account of the disorder, published by myself, is contained in *THE VETERINARIAN* for 1834: this since has received such confirmation from other quarters, as to leave no doubt in my mind, that, rare as the malady acknowledgedly is, and hitherto undescribed as it has remained, it will one day find a place in our established veterinary nosology.

DEFINITION.—Febrile catarrh, speedily succeeded by the appearance of scarlet spots upon the Schneiderian membrane and surface of the skin; attended with anasarca, and in some cases dyspnoea.

SYMPTOMS.—For two or three days at the commencement it will probably be mistaken for catarrh; about this time, however, its veritable nature becomes manifested by the appearance of numerous scarlet spots or blotches upon the membrane lining the nose, possessing the hue of arterial blood, irregular in size and figure, and visible as high up as the membrane can be inspected. These appearances mostly assume the character of petechiæ, though I have seen them running in streaks. They look like so many patches of extravasated blood; but, if one of them is wounded, blood instantly trickles down the nose, and assures us that—partially and singularly distributed as it is—it is still fluid, and still contained within its vessels. In passing our finger over the red

spots, nothing like pimple, or pustular elevation of surface, is discoverable. The skin is every where similarly bespotted; at least, I infer so from the results of my examination of the body of one horse that died of the disorder, whose case I shall subjoin. A mucous defluxion proceeds from the nose. Anasarca is a common attendant; the legs, sheath, and belly, being on occasions considerably tumefied. The respiration is quickened, but in such manner as rather to indicate pain than embarrassment. The pulse is likewise accelerated, and beats with force. There exists great disinclination to move about. The appetite is either quite lost or very much impaired.

TREATMENT.—In two cases, early venesection, closely followed up by the exhibition of purgative and diuretic medicine, with walking exercise, proved completely successful. Another case, however, had a fatal termination: it was not altogether in my own hands, and I attributed the unfortunate issue in some measure to excess of walking exercise, practised for the purpose of keeping down the anasarca which supervened upon the primary attack.

A brown colt, the property of Sir A. F., who had undergone the operation of castration six or eight months before, was admitted into the infirmary with a catarrhal flux from the nose, and the Schneiderian membrane every where covered with scarlet spots, looking like so many patches of extravasated blood. The lips were greatly tumefied, and had the same tuberculated corded feel that we perceive in farcy. The submaxillary glands on both sides were much enlarged, as also were the lymphatic glands of the breast and thighs. No anasarca at first; subsequently, a great deal. Respiration augmented; pulse 100. No appetite. Indisposition to move, and in the hind quarters much apparent inability to do so. Blood-letting, purges, and diuretics, were prescribed, and exercise enforced; but all to no purpose.

AUTORSY.—The lungs and other viscera in a healthy condition. The skin, when stripped off, exhibited precisely the same scarlet-spotted aspect which the nasal membrane manifested during life. There was no ulceration in the membrane of the nose, nor any collection of fluid within the sinuses of the head.

Another case of scarlatina is related in *THE VETERINARIAN* for 1835, by Mr. Chapman, V.S., Southampton.

This commenced with symptoms of severe laryngitis. The pulse was 70, and wiry; the mouth hot; the Schneiderian membrane highly injected; cold extremities; and cough so violent at times as to cause the patient to reel

against the side of the stable for support. Moderate blood-letting, small doses of aloes in combination with digitalis and nitre; and tartar emetic ointment rubbed upon the throat. On the 9th or 10th day the Schneiderian membrane became "covered with scarlet patches, irregularly formed. The hair had come off part of the neck where a blister had been applied, and I (Mr. C.) could discover similar patches there. I (Mr. C.) should have no hesitation in saying that the principal or the whole of the body was covered with similar spots. The upper lip became swollen." There is also "an aqueous discharge from the nose." This case Mr. C. recovered; curing the cough along with the scarlatina.

The subject of Mr. Chapman's case having had a cough for some time previous, makes it difficult to say at what precise time the scarlatina first commenced; whether the acute attack was from the beginning of that nature, or whether it was laryngitis at first, which afterwards turned to scarlatina. According to the former supposition, the eruption made its appearance *late*—certainly later than in the cases I have witnessed. It would be desirable to learn the period at which the eruption might be expected; it would be still more so to learn, if it be possible, what particular symptoms are indicative of its approach. In our own persons scarlatina is a highly contagious disorder. I have, however, no notion of its being so in horses.

COUGH.

DEFINITION.—Cough is the sound produced in the throat by a sudden and violent expulsion of air from the lungs.

COUGH DIFFERS FROM ROARING in being the product of expiration alone, and in that expiration being of a convulsive nature: roaring results from impediment in breathing, and is most remarkable in inspiration.

PATHOLOGY.—From the circumstance of cough being present as a symptom in several diseases, and in some without being regarded as itself of other consequence than the annoyance it gives rise to, it has become a question among nosologists, whether, even when it appears to exist alone, it can with propriety be viewed as an idiopathic affection. Our observations certainly tend to erecting it in certain cases into a disorder *sui generis*; although at the same time we are prompt to admit that it occurs much oftener as an attendant of some other malady. We have just seen that it constitutes one of the ordinary symptoms—and on occasions a very troublesome one—of catarrh; we have also found it present in strangles, in bronchitis, and in laryngitis: it is also to be met with in pleurisy and in certain stages of pneumony.

DIVISION.—This view of the subject enables us to make a division of coughs into such as are *sympathetic* and such as are *idiopathic*.

THE CAUSES OF COUGH have, some of them, been already pointed out: most of them may be said to be comprised in diseases of the air-passages and lungs; but to these are to be added others, which, from not being so demonstrable, have been less noticed. Gibson informs us, that "some young horses are subject to cough and slight fever when they are breeding their teeth, but especially before they cut their tushes:" an observation perfectly consonant with the irritation which we know teething occasions, and one confirmed by my own practice, though I cannot precisely say how far the cutting of the tushes has any *particular* influence. It is also remarked by some of the old writers, that "worms in the stomach and bowels" give rise to cough: among the moderns, Mr. Blaine is of this way of thinking. Hurtrel D'Arboval includes disorders of the kidneys and bladder among the sympathetic causes of cough. That cough in our own persons, among numerous other producents, may originate in disorder of the digestive organs, in particular of the stomach and liver, is no longer questioned by surgeons; and that it may have the same origin in horses I think myself admits of no doubt.

Observation has long ago made us acquainted with the sympathies existing between the several mucous membranes of the body; and in no case is this stronger or more remarkable than in the instance of the air-passages and alimentary canal; a fact from which we may derive a solution at once of the connexion between cough and disordered stomach or bowels and worms, as also between cough and affections of the kidneys and bladder.

BUT COUGH MAY BE IDIOPATHIC; its seat being either the larynx or windpipe or lungs, and its existence solely depending on some inflammatory or other morbidly irritative condition of one or more of these parts, and that condition existing by itself, or without connexion with any other disorder that may be present at the time.

OUR PROGNOSIS, it will be inferred from what has been stated, in a case of cough, must not be abruptly or incautiously formed. We must endeavour to ascertain its origin and its duration, its

nature, sympathetic or idiopathic: we must also pay attention to the *kind of cough*—the particular sound emitted—which in some cases will of itself bespeak its nature. From the bold sonorous cough, characteristic of the sound condition of the air-passages and lungs, we distinguish, by practice, the humid cough; the dry, hard, or short cough; the soft or feeble cough; the hollow cough; the intermittent cough; and the broken-winded cough.

THE HUMID COUGH is that which commonly attends catarrh, strangles, bronchitis, influenza; and in some instances other disorders. It may, however, be idiopathic. It is accompanied with expectoration, which, when abundant, shews itself in defluxion from the nose, and is, in the act of coughing—which is often prolonged, and, by mucus collected in the throat, rendered exceedingly painful and annoying—ejected into the mouth, causing the animal to move his jaws and tongue about, slabbering out part and sucking in the rest of the expectorated matter, and swallowing it. In cases of sore throat and inflammation in the chest this becomes a weak or feeble cough.

THE DRY OR SHORT COUGH—independently of its being a sign of an inflammatory or unsecreting condition of the air-passages—may arise from sympathetic irritation, although I believe it will oftener be found to be idiopathic. Teething may occasion it. Disorder or irritation in the alimentary canal may generate it. How often is it that a young horse having what grooms call “a constitutional cough,” is at the same time looking rough in his coat, and altogether out of health! May not this—which we are in the habit of ascribing to diseased lungs—be owing in some cases to disordered or imperfect digestion? I have observed that flat-sided, pigeon-breasted colts are the most frequent subjects of cough, as if malformation of the chest was also occasionally concerned in its production. But, every now and then, a horse is brought to us with a cough of this description, looking in perfect health and condition, the cough seizing him only while out at exercise, or on his first leaving his stable, or when cold water is given him. He may have had this cough for weeks or months, or even years: in the latter case, it troubling him every winter. The cough may have originated in catarrh, or some inflammatory attack of the air-passages or lungs,

or it may not be traceable to any such cause: it may be idiopathic from beginning to end, or it may become idiopathic after being for a time sympathetic. The probable seat of this cough is the larynx; I believe it to be often confined to the rima-glottidis. Any tumour pressing on this part might occasion it. In the absence of this, it is probably owing to congestion or thickening of the membrane, and consequent morbid irritability. D'Arboval describes the cough of pulmonary consumption as small, short, feeble, and accompanied with a sort of wheezing.

THE HOLLOW COUGH.—A deep sepulchral sort of sound, something of a compound between a cough and a groan, emitted, according to the sensation the sound conveys, from the very inmost recesses of the air-passages. So peculiar is the sound of this cough, that, being once heard, it is not likely to be forgotten; and yet, for my own part, I must acknowledge myself unprepared to enter into its nature, or to offer any thing satisfactory on the subject, either of its origin or tendency. I have known many horses affected by it: I know one at the present time, whom I am in the habit of seeing from day to day: he is in perfect health and spirits, and seems not to be troubled or disordered by his cough, otherwise than the temporary inconvenience the effort occasions him.

INTERMITTENT COUGH is the name we give to those fits of coughing with which horses are in the habit of being seized on a sudden, and oftener at work than during repose. The cough is a dry, hacking, half-suppressed one, is repeated several times in quick succession, and does not return again for some considerable interval. It is a cough that may endure a very long time. Delafond says it proceeds from pulmonary emphysema.

THE BROKEN-WINDED COUGH is the one emitted in the disorder we call "broken wind." It is itself so completely characteristic of that disease, that we require no other test; and withal it is quite distinct in its sound from all other coughs. I shall defer all description of it until the subject of broken wind shall come under notice.

TENDENCY OF COUGH.—There being several disorders that are on occasions ushered in by cough, it is difficult to say, in the

first instance, when a horse is brought to us with recent cough, to what it may owe its origin, or, symptomatically, be leading. It may be but the forerunner of simple catarrh; it may usher in bronchitis, pleurisy, pneumonia, &c. On the other hand, it may continue without the manifestation of any other disorder, as a simple cough, only of present consequence inasmuch as it proves troublesome and annoying, especially during work. In allowing this cough to run on, however, and particularly in suffering the animal to work with it, we run a risk of spreading the irritation already existing in the air-passages, and at the same time producing febrile disorder in the system. Should this not follow, we shall in all probability, by neglecting the cough, have it become "settled," or "established," or "chronic," and in that form more difficult than ever to remove; or, when removed, extremely likely to recur, and especially in the winter season. What may result from the continued irritation of chronic cough—one which is sometimes better, sometimes worse, or that disappears in summer and relapses in winter—it is impossible to say: much will depend on the condition, sound or unsound, of the animal's lungs; a horse in whom those viscera continue healthy may have a cough for years, and never experience any ill effects from it; in another, with unsound lungs, it may lay the foundation for thick or short wind, or for pulmonary consumption. There is a notion abroad that a short cough is likely to "end in broken wind:" I cannot, however, myself subscribe to this prognosis.

THE TREATMENT OF COUGH must be directed to the fountain-head of the malady, to the seat of disease or irritation, to the existence of which the continuance of the cough is owing. A cough, an accompaniment of catarrh, will only vary the treatment recommended for that disorder, in inducing us to stimulate or blister the throat, when probably without it we might not have deemed that necessary. The cough resulting from disease of the lungs, commonly slight and feeble, will require no especial attention; unless it should continue after the subsidence or disappearance of the pulmonary disorder, which it but rarely will be found to do. The cough often attendant on dentition will be treated with most effect by a soft diet, a gentle aperient, and the lancing of the gums over such tusks as are about making their way through.

Suspected disorder in the alimentary canal or liver must be rectified before the cough—should it be supposed to be connected with such disorder—can be removed. Should worms be present, the case will require vermifuge medicine.

IDIOPATHIC COUGH WILL REQUIRE more special treatment. When recent, and there are signs of concomitant febrile action, such as increase of pulse, heat of mouth, dulness, &c., antiphlogistic means are indicated: the abstraction of from three to four quarts of blood; aperient-febrifuge medicine, mash-diet, and so forth. The febrifuge ball may be given daily, until some slight impression is made on the bowels; actual purgation being not only unnecessary, but harmful. The animal should be forced—starved from water—to take demulcents for drink; and the best way to accomplish this is to hang up a pailful of clear, thin, well-made water gruel, or linseed tea, which is better still, in his box; supplying him from time to time with fresh, whether that be consumed or not, but not shewing him any water. These antiphlogistic remedies are very likely to convert the cough into a case of catarrh, should that not be the natural tendency of the former; and this auspicious change will be still more likely to be induced by steaming the nostrils. A stimulating application rubbed upon the throat will prove beneficial, and particularly so after blood has been removed: for this purpose we may use a liniment composed of equal parts of solution of ammonia and olive oil; or we may employ the turpentine liniment, which is composed of one ounce of soft soap, half an ounce of camphor, and a quarter of a pint of oil of turpentine, well shaken together. For my own part, however, I prefer a sweating blister to these liniments: there is no occasion to remove the hair, and care should be taken not to rub in above a table-spoonful of the liniment of cantharides, lest it cause the skin to peel off.

IN COUGH UNATTENDED BY FEBRILE EXCITEMENT, and which, as far as can be ascertained, of itself constitutes the sole ailment, the following ball may be exhibited morning and evening:—

Take of Camphor	3ij
Squill, powdered	3j
Opium, powdered	3j
Liquorice powder	3ij

Bruise the camphor with a table-spoonful of spirits of wine; then add the remaining powders, and make them all into a ball with honey or treacle.

This medicine is not intended to supersede bloodletting and blistering, which are both, in almost all cases of coughs, of paramount, in some, of indispensable, importance. Before quitting this part of my subject, I would observe, that repose is absolutely necessary for the cure of cough: so long as the horse continues to be taken out, and especially in damp cold weather, so long shall we in vain administer to his cough. Loose in a box, he needs no exercise; on the contrary, he should be kept quiet, and be warmly clad, with even his legs bandaged with flannel, should the weather prove cold.

DIET.—Change of food often proves of service to a horse having cough. In summer green meat may be substituted for hay, and no corn allowed the while. In winter, in lieu of corn, carrots or turnips, mangel wozzel, potatoes, or parsneps, may be given, properly cut, or, rather, sliced.

IN CHRONIC COUGH—cough that has been neglected, and that has from its duration, or habit of relapse, resisted such treatment as above recommended—I have often experienced benefit from the insertion of a seton in the throttle; a practice I myself prefer in this case to a rowel under the jaw. And when there is the least suspicion that the cough is kept up by any source of irritation within the thorax, a rowel may be insinuated in the breast; for with this I have known medicine to succeed, when, without such collateral aid, it has failed. The medicine best adapted for a case of this latter description has appeared to me to be the following:—

Take of Barbadoes aloes	ʒj
Calomel	gr. xv
Potassio-tartrate of antimony	ʒiiss
Simple syrup sufficient for a ball;	

which may be given once or twice a-day, according to circumstances.

ON ROARING.

ROARING is no more a disease in horses than crying is in ourselves. It is but a symptom, and of itself so vague a one, that, without much careful investigation, it is often as difficult to say what disorder is producing it as to divine the cause of a person's grief.

DEFINITION.—Roaring may be defined to be, breathing with a loud or unnatural sound, under exertion of any kind.

THE SOUND or noise emitted varies under different unnatural conditions of the air-passages, and also under different degrees of exertion to which the animal may be put. With a view of elucidating the first of these assertions, I shall relate an experiment I made some years ago, touching the constriction of the windpipe. The second assertion rests upon facts known, I believe, to most experienced horsemen; viz. that roarsers made to gallop very fast become whistlers; and, pushed to their utmost speed, lose even their whistling noise. These varieties in the sound or "roar" have given rise among horse-people to the epithets, "grunters," "wheezers," "whistlers," "high-blowers," "trumpeters," &c. The experiment I made is this:—

I passed a ligature of broad tape around the windpipe at about one-third of the length of the neck from the head. The tape was at first drawn only moderately tight, and the animal roared when made to trot. Next, the pipe was compressed to about half its natural caliber: the animal then whistled. In both states the sounds emitted were found *loudest in inspiration*. At last, I drew the ligature as tight as I was able to do. In a minute afterwards, the animal, after staggering a good deal, fell down, struggled violently, and suddenly throwing himself upon his side, expired in two minutes after he had fallen. I found the membrane lining the windpipe reddened, and covered with frothy mucus. The ligature had *not* completely obliterated the canal: I could still pass a crow-quill through the constricted part of it.

From this experiment we learn, that a certain diminution of the caliber of the air-tube produces roaring; that further diminution or contraction of its area causes whistling; and that a degree of constriction beyond this occasions signs of suffocation, which, if not relieved, end in the extinction of vitality. A whistler, therefore, I should call an intense roarer; a wheezer, I should say, is some-

thing short of an actual roarer. Be it remembered, however, that, although I am attempting such nominal distinctions, in a pathological view they must all come under one general heading, which, by common consent, at present, we denote by the appellation of "roaring."

WHAT IS THE CAUSE OF THE SOUND?—The experiment just detailed shews, as far as it goes, that the roaring is to be ascribed to a diminished area of the passage for the air to and from the lungs; and, in truth, this will be found to be the essence of the etiology of roaring. The various collected reports that have been made from time to time on the states of the air-passages of roarsers, have shewn that all of them have produced the effect in one of three ways, viz. either by contraction of the passage or its orifice; by distortion, or deformity of it; or by obstruction within it: and this difference of causation, together with the part or place in which it exists, will serve still further to account for the various kinds of—or, rather, sounds emitted in—roaring.

THE KIND OR NATURE OF THE SOUND, therefore, will be found to be referrible—first, to the nature of the impediment or obstruction; secondly, to the degree or extent to which it exists; thirdly, to the situation of it. To illustrate this by example, we may expect a different sound from thickening of the membrane, or *general* diminished caliber of the passage, from what either ulceration, or ossification, or *partial* diminution or impediment, would produce; this sound will vary again, according to the degree of thickening, or contraction, or ulceration, or ossification; and, thirdly, it will undergo modification, according to the part whose lining membrane is thickened, or ulcerated, or ossified; according, in fact, as its seat happens to be the nasal chambers, the larynx, the windpipe, or the bronchial tubes. I do not mean to assert that all this can be realized in practice. Unfortunately for us, I am afraid we shall find our art not sufficiently advanced to connect the sound, in many cases, with the seat and nature of the cause; but I mean to contend, that, if we would set about the investigation as men of science, all these considerations must enter into our theorification.

WHEN IS THE SOUND EMITTED?—Whenever any sudden effort or exertion is made, or any hard or fast work performed—

whenever, in fact, the breathing is so disturbed that the current of air through the windpipe is rendered rapid and voluminous. So long as the air passes in a slow and uniform stream through the pipe, as in ordinary breathing, no noise is heard nor inconvenience felt by the animal; but the moment any rush of air is made, the contraction or impediment, whatever it be, opposing this augmentation, roaring is produced by the vibration of the air against the obstructing body. So long as a horse continues at rest, or goes but at a foot's pace, or even but trots, although he be a roarer, no roaring, probably, is heard—no person would discover his imperfection: gallop him, however, and particularly up hill, and press him hard, and, as the dealers say, "you may hear him in the next parish." Heavy draft, in harness, will have the same effect. And so will any sudden act of exertion, such as a leap, or jump, or gambol of any sort. Even fright, or sudden alarm of any kind, will elicit the noise. In fine, whatever induces vehement breathing will be apt to make the roarer disclose his imperfection.

IS IT A SOUND OF INSPIRATION OR EXPIRATION, OR OF BOTH?—Ordinarily, it is only in inspiration that the sound is heard. Under circumstances of great distress, however, as when a horse is galloped to bursting, and especially should it happen that he is one of the worst class of roarers, the sound is audible enough in expiration as well as inspiration.

THE TESTS OF ROARING suggest themselves from a knowledge of the fact, that a horse must be made to breathe with a sudden effort, or else experience a degree of labour and difficulty in drawing his breath, before the sound can be elicited. For the purpose of producing this sudden respiratory effort, our common practice is to make a feint or threat to strike the animal, which rarely fails, should he have the disorder, to call forth, involuntarily, the roar, or rather grunt, and so confirm our unfavourable suspicions. Should the animal not be a roarer, the alarm we create occasions no sound whatever in the breath. Next, we cough the horse. The protracted grunting or groaning of the cough being to an experienced ear equally characteristic, may, in conjunction with the former test, be received as quite satisfactory. I regret, however, to be compelled to add, that the absence of these

summary tests will not, in all cases, bear us out in pronouncing the horse not to be a roarer. In a case of this kind, my common observation to the gentleman whose horse I may be examining, is, "I do not find your horse roars either on being struck or coughed; but you must not take this remark to imply that he is 'perfectly sound' in his wind. In order to satisfy yourself of that you must give him a 'splitting gallop,' and, if practicable, on soft ground or up hill: this is your only sure mode of detecting minor imperfections in wind." I have heard Mr. Sewell, the present Professor, say, "that the best trial we can subject draft-horses, suspected roarers, to, is to put them in harness, and compel them to drag heavy loads:" and I quite agree with him; it being in laborious draft in particular that the respiratory powers are called into play.

TO CONCEAL THIS IMPERFECTION, a knavish horse-dealer will, when he is shewing you a roarer, take especial care that the horse both leaves and approaches you at a gentle pace, and does not strike into the gallop until he is removed to too great a distance for you to hear the roar. He will likewise, when dismounted, intimidate you, if he can, from approaching the animal; in fact, he will practise every device rather than suffer you to put the horse fairly to any test.

DOES ROARING CONSTITUTE UNSOUNDNESS?—This is a point on which the same judge (Lord Ellenborough) has delivered two opinions; the latter upsetting the former one, and establishing roaring, for the time to come, as *unsoundness*. The first opinion was given in 1810. His lordship then said, "It has been held by very high authority, that roaring is not necessarily unsoundness; and I entirely concur in that opinion." In 1817, his lordship pronounced, in reference to a similar case, that, "if a horse be affected by any malady which renders him less serviceable for a permanency, I have no doubt that it is unsoundness. I do not go by the noise, but by the disorder." And from that time to the present, roaring has been admitted, in court, to be a species of unsoundness.

M. Huzard, jun., a French veterinarian, has penned the following sensible observations on this question:—"If roaring were an accompaniment of ordinary respiration, the evil would be discoverable at the time of purchase: but, in consequence of its requiring exertion to elicit it, the purchaser who does

not put the animal to that test cannot become conscious of its existence. In every instance, roaring detracts from the speed and duration of the animal's paces, and consequently depreciates him. Sometimes it renders the horse incapable of performing any (fast ?) work at all. A horse is most unquestionably returnable for it."

ROARERS, THOUGH UNSOUND, STILL SERVICEABLE.—We are not to imagine, that, because a horse is a roarer, he is altogether useless. There are many instances of roarers doing hackney work very well, and some of their doing their duty as hunters with very little annoyance to their riders or distress to themselves. Indeed, to repeat what I said before, and I have heard the remark more than once from those who have hunted roarers, "the faster they go the less noise they make." A great deal, however, will depend on their condition. When that is hard and good, it is quite surprising what a difference it makes in the noise. Roarers are most of all objectionable as harness-horses. Coach-proprietors are so fully impressed with their incapacities for the purposes they require—fast and laborious draft—that, in a general way, they refuse to purchase them at any price. The following reminiscences from Nimrod are at once so characteristic and rich in truth and humour, that I cannot forbear inserting them here. "I never purchased but two roarers, and they cured me of going to that market again. One nearly broke my neck at a fence, having entirely lost all his powers in the space of five fields; the other I christened 'the Bull,' for he could have been heard half-a-mile off if he got into deep ground. Notwithstanding this, I have seen two brilliant hunters that were roarers."

MARES SELDOM BECOME ROARERS, at least, in comparison with horses. This is a fact, I believe, too notorious among men of horse experience to admit of doubt; though it is one for which it appears difficult, if not impossible, to assign any satisfactory reason. However, as I am informed, so stands the fact.

ROARING IN MAN.—Of this, one instance only has come to my knowledge. I was out shooting one day with two friends, one of whom was quite a lad; when, as I was walking by the side of the other up a hill, I suddenly heard such a whistling behind me that I sprang round with alarm, thinking there was a roaring or

rather a whistling, horse galloping close at my heels. My fright subsided, but surprise and curiosity took its place, at finding it was my young friend, who was making all this noise in his efforts in climbing the hill. On laughing and telling him he was "a regular whistler," he informed me, he had, not long before, been the subject of a severe bronchitis.

PATHOLOGY OF ROARING.—This includes the investigation of the morbid and other causes on which the existence of roaring depends; and it is a part of our subject replete with interest, seeing that it is upon this knowledge that all our hopes and expectations of cure must be erected. Unless we can arrive at a thorough insight into the cause of the evil, we shall deceive both ourselves and our employers in attempts to remove it. To hear people talk about *the seat* and *the cause* of roaring, one would suppose that both might be included between the finger and thumb, and that it was either too mysterious ever to be developed, or was universally in one place. They are such unscientific and narrow views as these that have led people to talk about the *cure* of roaring, as if some remedy were to be discovered at once to remove the evil. Such discourse may impose upon our employers; but, surely, among ourselves, if we aspire to be thought men of science, it must be disgusting in the extreme. Unless what I am going to relate is untrue, it must be evident enough, even to unprofessional minds, that the causes of roaring are many and various, and that, consequently, the remedies cannot but be something like proportionate in number, and oftentimes extremely dissimilar.

ROARING IS NOT A DISEASE, BUT A CONSEQUENCE OF DISEASE—of catarrh, strangles, influenza, laryngitis, bronchitis: to which Hurtrel D'Arboval has added, pleurisy and peripneumony. Now, let it be observed, that these are all inflammatory diseases of the mucous membrane lining the air-passages, and that the ordinary consequence of their virulence or long continuance is

THICKENING OF THE MEMBRANE, with occasional ulceration of it; and this it is that appears to constitute in *young* horses the common cause of roaring. How many three and four-year-old horses are there passing from the dealer's or breeder's hands into

stables, who, soon after their arrival therein—particularly if it should be in the spring or autumnal season—breed strangles or distemper, or else contract cold and sore throat, any of which disorders, in a severe form, settling upon the throat and windpipe, will be very apt to lay the foundation for roaring, by leaving behind them a thickened, and perhaps an ulcerated, membrane, and most likely at the part where it lines the glottis, though the same may take place within the cavity of the windpipe. There is also reason to believe that similar alterations of structure, even within the branches of the windpipe—the *bronchial* tubes—may have the same effect in kind, if not in degree. In the course of time, the thickened membrane is found to undergo still further changes : from being simply thickened, it turns opaque and white, and acquires a leathery, indurated feel and texture—organic transmutations which set all and every kind of treatment completely at defiance.

ULCERATION OF THE MEMBRANE OF THE LARYNX, particularly of that part lining the glottis, is very apt to follow an epidemic, or specific, or malignant inflammation of this membrane; and this ulceration will often assume a sort of chronic inactive form, in which state I have had reason to believe it has continued for years, or even to the end of the animal's life. Such a case of roaring, it is obvious, would require a treatment altogether different from most others.

METASTASIS.—Any inflammation about the throat or its vicinity may, by extending to or settling upon the larynx or windpipe, in the end be productive of roaring. In illustration of this, I cite the following :—

The late Mr. Coward, V.S., Royal Artillery, had, in a horse of his own, the simple operation of bleeding succeeded by extensive tumefaction and suppuration of the jugular vein ; and this followed by abscess of the parotid gland, disease of the larynx, and permanent roaring.

BANDS OF COAGULABLE LYMPH effused into and running across the cavity of the windpipe constitute another source of roaring ; but, I believe, a very rare one. The inflammation is the same, and its disposition the same, as in the former case ; only instead of the lymph being effused into the interstices of the mem-

brane, and thickening its substance, it is poured forth upon its surface, where it assumes any form chance or circumstances may happen to give it, and, in the end, becomes organized, and part of the pipe itself, or rather of the membrane.

In the veterinary museum formerly belonging to my father, is a preparation in which the muscle has been displaced by the formation of a cross-band of coagulable lymph between it and the posterior part of the tube, by which the interspace is divided into two passages, one large enough to admit a walnut, the other a hazel nut. The horse it was taken from breathed with labour and exertion, and, even when but moderately exercised, roared aloud.

OSSIFICATION OF THE LARYNX, by which is meant the entire or partial conversion of its substance into bone, a change peculiar to aged horses, may exist either as a cause or a concomitant of roaring. The parts commonly found thus converted are the *thyroid* cartilages; though the others, at a later date, may participate in the change. It seems to be the result of some chronic inflammatory action excited in the cartilages; and this I feel inclined rather to ascribe to the injurious constraint to which the larynx is so repeatedly subjected, than to any of the causes which give rise to it in the membrane. We occasionally meet with partial, but rarely with entire, osseous conversion of the rings of the windpipe; nor do we often see bony accretion of them one to another.

DISTORTION OF THE LARYNX AND WINDPIPE, there is every reason for believing, is a fruitful source of this vexatious disorder. Dissection is every day adding to the instances of it; and when we come to meditate upon the notorious fact, that

HARNESS-HORSES CONSTITUTE A LARGE CLASS OF ROARERS, we shall probably regard these views as well founded. When we look around us as we pass through the streets of London, and count the numbers of fine high-spirited horses there are in carriages, waiting for hours and hours together for their masters and mistresses, and all the while reined up with their necks crooked in a form unnatural, and constrained, and painful even to behold, much more to be borne, as is sufficiently manifest to any one from the continual jerks up and down of the suffering animals' heads; and when we come to consider the constriction—nay, compression—that must all this while be exerted on the larynx, together with

the forced bend that must in many take place in the upper portion of the windpipe, can we wonder that these parts should undergo distortion? At first, it is true, the distortion is but a temporary grievance, the intervals of relaxation affording the parts, by nature highly elastic, an opportunity of recovering their shape and tone. Repeated and long-continued acts, however, of such violence gradually enfeeble the elastic powers of the cartilages and their ligaments, and the result is, permanent deformity of the larynx or windpipe, or of both together.

THE TIGHT REINING-IN OF THE HEADS of young horses for any length of time together, and particularly of subjects whose necks have not, by regular gradations of tightness of the reins, been brought to bear the constraint with comparative impunity, is a practice at all times highly censurable, and one that has too often, in times past, given us reason to date the origin of roaring from the breaking of a colt, or his first lessons in the manege. Such harsh treatment, however, is now, in all well-conducted riding-schools, I believe, pretty well abolished; leaving us no further grounds for apprehension on this score, unless it be in the case of a colt whose head is so unmeetly set on, or whose neck is so straight, or short and thick, that, without a force and constraint likely to be productive of injury, there is no possibility of getting the animal's head into its "proper place."

Mr. W. H. Goodwin, veterinary surgeon to the Queen, informs me, that, during his professional avocations at St. Petersburg, his attention was especially drawn to several horses, who, by himself and others, had been declared to be roarers, in consequence of their having got rid of their complaints in the manege. These horses, it would appear, roared in consequence of distortion produced by previous unnatural flexure of the windpipe; and this distortion the Russian system of equitation—which consisted in the elevation of the head and projection of the nose—was well adapted to counteract, and, in process of time, remove.

WASTING OF THE MUSCLES OF THE LARYNX.—Some years have now elapsed since it was first discovered that the larynges of roarers occasionally presented us with the singular phenomenon of the muscles on one side being wasted away or absorbed, while, on the other, they appeared to exhibit unusual volume and redness, and strength of fibre. Since the first discovery, every one

almost has met with cases of the kind; but no person seems as yet to have given an explanation of this new piece of pathology. My view of the case is this :—

[Since the following explanation was written, I have met with an account of a very ingenious and satisfactory experiment performed by my friend Mr. John Field, which will be related hereafter, wherein he has conclusively shewn, that this wasting of the muscles may be the effect of the deprivation of nervous influence. I must still, however, continue to think that there is another way in which the change may take place, and that is as follows :—]

Horses in general, as every man in the habit of riding and driving knows, have what is called “a hard and a soft side” to their mouths; and there is no situation in which they are more likely to contract this—should they not have it before—than in harness; for the animal is no sooner borne or reined up, than, in order to give himself as much ease as his constrained situation admits of, he inclines his head to one side, and in that position carries it, all the while bearing with the hard side of his mouth against the bridoon, and thereon reposing, for ease, almost the whole weight of his head. The effect of this on the larynx, is, that while one side is compressed, and cannot act, the other is left, comparatively, at liberty; or, at least, so far unconstrained, that, by some extra exertion, the muscles on that side are enabled to perform their functions, while on the other no action can take place at all.

I had long framed this theory in my mind, when, one day perusing Mr. Youatt's Lectures in *THE VETERINARIAN*, I was not a little gratified to observe that my friend had been entertaining some such notions as my own, although he had not gone the same length in his explanation. His words are—“In the far greater number of cases there is distortion, rendering the muscles on one side useless, and, therefore, causing them to waste away.”—“The wasting of the muscles, therefore, is the *effect*, and not the cause, of that which produces roaring.”

Now that fashion bids us to leave our bearing-reins at home—and a very good fashion, when horses have been properly bitted, this is—we shall find, probably, some diminution in the number of harness-horses that become roarers.

DEFORMITY OF THE LARYNX OR WINDPIPE, by which I mean original malformation of them, is included by the French veterinarians among the causes of roaring. I do not remember ever having met with a case of the kind myself; though I once saw a preparation which gave me great reason for believing that the canal of the windpipe might be mis-shapen even from birth.

It was a wet preparation. The canal of the windpipe, instead of being circular, was triangular, the sharp angle being turned forwards. Behind, the flaps of the rings of the pipe overlapped one another much beyond what was natural. The lining membrane was thickened throughout its extent.

MECHANICAL OBSTRUCTION proves an occasional cause of roaring. A tumour of any sort, or any foreign body, pressing against the air-tubes, or forming within their cavities, may, either of them, be productive of roaring.

THE HEAD MAY BE THE SEAT OF ROARING.—My old friend and school-fellow, Mr. James Turner, in 1837, sent a paper to *THE VETERINARIAN*, the product of very accurate observation of a decided case of roaring in a horse sent to his Infirmary to be destroyed on account of lameness.

Having completely satisfied himself of the existence of the disorder—the noise made being “precisely that of a common roarer,”—and in one of its most aggravated forms,—he very carefully examined the larynx, trachea, and lungs, after death, without arriving at the cause, which at length was discovered to be in the head. “The right anterior and posterior turbinated bones were enormously enlarged,”—“dilated,”—“not distended by any accumulated contents.” “Upon attempting to pass my finger,” continues Mr. T., “down the passage through the palatine arch, as a sound or a probe, it was opposed by the turbinated bones being almost in contact with the septum, owing to their dilatation.” Subsequent drying of the head shewed that that which in the recent state had appeared like enlargement or exostosis, was “owing simply to the dilatation of every cell or interstice, all of which were perfectly empty.” “This horse’s case may apply to hundreds. In all probability this permanent unsoundness was the sequela either of severe catarrh or strangles.”

Science is indebted to Mr. Turner for the development of this new fact; but I cannot myself regard it otherwise than as an occasional—not a common—cause of the disorder.

Professor Sewell met with a case of roaring, in which he found an exostosis growing from the cervical vertebræ, between the two first ribs, and

pressing against the windpipe. The French authors present us with accounts of *polyp* in the nostrils; a piece of ribbon in the chamber of the nose; a molar tooth displaced, and thrust into the same situation, producing roaring; but for my own part I never met with any cases of the sort.

PULMONARY COMPRESSION.—Hurtrel d'Arboval includes both pleurisy and peripneumony among the causes of roaring.

A question has arisen, whether or not we are warranted in regarding the *lungs* as the seat of roaring. The subject being one on which individual experience is necessarily contracted, it is only by an appeal to practitioners at large that such a question can be satisfactorily answered. In my own mind theory would seem to reply in the negative: the following case, however, makes me stagger in this opinion. The case occurred to my late much respected father.

A horse was treated for violent roaring. The neck was repeatedly blistered; it was even fired; but no relief was obtained. So painful was it to hear the animal roar, when he was even gently led out of the stable, that bronchotomy was had recourse to: but without avail. At length, seeing the animal continued to suffer so much pain and distress in breathing, and that the case appeared altogether insusceptible of being relieved, it was determined to destroy him. On examination, no thickening of the laryngeal or tracheal membrane appeared, nor, in fact, any other disease of those parts. But the lungs were hepatized throughout their substance, and the smaller divisions of the bronchial tubes in many places so compressed that they were hardly pervious.

From the circumstance of the operation of bronchotomy not having any effect in this case, it is obvious enough the cause must have existed within the bronchial tubes: there cannot, therefore, remain any further question about the seat of roaring occasionally being the lungs. In confirmation of this stands the testimony of Mr. James Turner, who says, "I have occasionally ridden some roarers, in which I have been perfectly convinced that the noise issued from obstructed bronchi within the lungs themselves."

NERVOUS INFLUENCE.—In the year 1826, M. Dupuy published, in the *Recueil de Médecine Vétérinaire*, an account of some extremely interesting experiments on this subject. He found that either compression or division of the eighth pair of nerves had the effect of producing roaring; and the rational explanation he gave

of the phenomenon was, that as the inferior laryngeal nerves which supply the dilator muscles of the glottis are branches of the par vagum, of course those muscles would become paralyzed; while the superior laryngeal, going to the constrictors of the larynx, preserving their power, would cause the glottis to be nearly closed, and thus occasion the animal to roar. Here is a new field opened for observation. We are not to expect division or destruction of continuity; but there are changes and accidents that may occasion compression, either of the par vagum or recurrent nerve, on one or both sides. Some French veterinarians have discovered, they say, little ganglions upon the nerve, compressing it. Mr. Youatt fancies the pressure of the collar or lower jaw may have the same effect. The formation of a tumour, any where in the course of the nerve, might, perhaps, do it. After all, however, I cannot say that I augur any great deal of elucidation from this new light.

SPASM OF THE MUSCLES OF THE GLOTTIS.—Vatel places roaring among "nervous disorders," though he admits there are but few cases in which it is referrible to spasm. My lamented friend Mr. John Field, whose opinion on every point of veterinary pathology was valuable*, very sagaciously observed, that the frequent cause of roaring, in cases of ulceration of the rima glottidis, is "spasm of the glottis." "While the horse," says Mr. Field, "is suffering great pain from the passage of the air over these denuded surfaces, the instinctive action of the muscles, more powerful than the will of the animal itself, partially closes the air-tube, and thus lessens the irritation. I have seen many cases of this kind, and by opening the trachea have obtained immediate relief. The roaring which supervenes during the development of glanders is precisely of this description." To prove the influence of the recurrent nerve Mr. Field made the following experiment:—

"Having ascertained that the organs of respiration of a horse used for farming purposes were sound, I cast him, and laid bare the recurrent nerve of the off-side, and passed a ligature loosely around it: he was then allowed to get up, and, after a few minutes, galloped severely without evincing the slightest defect in his breathing. The nerve was then drawn out by the ligature, and one inch and a half of it excised; and immediately, on only trotting the horse a

* See Proceedings of Veterinary Association, in *THE VETERINARIAN* for 1837.

short distance, such a degree of roaring was occasioned, that, had the exertion been continued, he would soon have fallen. I kept this horse four years; and, though his breathing became much better, he continued a sad roarer: at the end of that time I destroyed him for the larynx, which exhibited the usual condition of wasted muscles on the side deprived of the influence of the recurrent nerve."

ROARING, HEREDITARY.—That roarers have both bred and got roarers, I believe there are instances enough on record to prove; but whether this be referred to some peculiar or faulty conformation, or can be regarded as the transmission of the disease itself, is a question which appears yet unsettled. For my own part, I should say, experience seems to teach us, that, so far as conformation or liability is concerned, diseases may prove hereditary; but I have no notion of morbid action being conveyed from parent to offspring unless through the medium of contagion or infection. That habits and vices, however, are so conveyed, there cannot remain a doubt.

Mr. W. J. Goodwin, whose observations in these matters must have considerable weight with us, has kindly informed me, in answer to my inquiries, that, to the best of his recollection, the mare called "Mary," by Precipitate, who was herself a roarer, bred a filly by Sorcerer, also a roarer, and that filly bred a roarer to Waterloo, called "Black Jack." In opposition to this, however, stands the following fact, for which I am likewise indebted to Mr. G.:—Taurus, a celebrated racer, a roarer, has covered several mares, and their produce are all turning out well and have won several races; in no one instance hisget having proved a roarer; and notwithstanding that his own family were all notorious for the disease. Mr. Goodwin knows of a mare who has produced four crib-biters, though covered by different stallions, and she herself not possessing the vice.

THE TREATMENT OF ROARING is an affair that will employ all our scrutiny and skill. As I said before, unless we can ascertain the cause of the evil, and make a shrewd guess at the nature and situation of this cause, we do little more than impose upon our employers, and upon ourselves too, in attempts to remove it. Towards this end, the first inquiry to be made, is, how long the horse has been a roarer. Secondly, whether the roaring followed catarrh, or cough, or bronchitis, or strangles, or distemper of any kind. Thirdly, whether the horse has run in harness, and is in the habit of being tightly reined up, and whether the roaring existed antecedently to

his going in harness, or has come on since. Fourthly, by careful examination, to ascertain whether there is any mechanical obstruction to account for the roaring; or any distortion, or deformity, or unnatural tenderness about the larynx or windpipe. Fifthly, if there is any reason for believing it to be nervous or spasmodic. Lastly, should there appear any chance of the horse being benefited by treatment, to inquire what is his value—what value his master sets on him—and whether his owner is willing to give him up a sufficient length of time for requiring a trial.

A CURE FOR ROARING is what—at least, in the common acceptation of the phrase—we do not possess; nor is it possible for a general cure to be included in any one individual remedy, or special set of remedies. That which would tend to remove it as the consequence of disease, would be entirely inapplicable in a case where it arose from distortion; while those means which seemed best adapted for a case of distortion would, probably, prove altogether inefficacious in one of mechanical obstruction. In fine, any remedy we may possess can only be suited to one description of disease; the art of cure consisting rather in the *adaptation* of the remedy than in the knowledge of the remedy itself. The only pretensions we, as men of reason and science, can set up towards a cure, are such as are founded on the understanding we may obtain of the immediate cause of roaring: all other boastings are downright quackery, and worse than quackery, imposition.

I introduce what follows in this place for the double purpose of shewing to what extent the public may be gulled by empirics, and what improvements our art has made, even within these very few years past. Clater, whose works surpass those of White by half-a-score editions—*ergo*, according to his own account, just by so much *par excellence*—"The rapid sale of *twenty-three large impressions* of this work has established its character upon the surest foundation"—these are his words—Clater, I repeat, in "Every Man his own Farrier," 24th edit., recommends for the "Cure of Roaring" a few aniseeds and caraway seeds, and a little Dover's powder, mixed with the balsam of sulphur and the yolk of an egg!—altogether about as effectual as White's squills, ammoniac, and aniseeds must prove in broken wind. And yet these are two works which, for the best part of the last half century, have engrossed the attention of the public! *Proh pudor!*

With a view of shewing the different plans of treatment apart

from each other, and of making it intelligible in what kinds of roaring they are respectively applicable, I shall suppose cases of the description that are likely to come before us, and affix to each of them the proper treatment.

AUSCULTATION, carefully practised, will prove very serviceable to us in discovering whence the sound proceeds, and leading, probably, to some better opinion as to what gives rise to it. The stethoscope may be used: but, in general, we shall do better, I believe, without it. It will be an important step towards treatment to make out whether the cause resides in the head, or the larynx, or the windpipe, or lungs.

TREATMENT OF ROARING, THE ACCOMPANIMENT OR CONSEQUENCE OF INFLAMMATION.—Should the roaring be recent, and the horse have been lately, or be still, labouring under any inflammatory affection of the air-passages—laryngitis, bronchitis, strangles, influenza, catarrh, or even cough—it will probably be requisite to employ depletive measures; though this again must depend upon what has already been done, as well as upon the nature, stage, and intensity of the inflammatory action present. Bleeding may be required; purging may be required; alterative medicines are generally useful; counter-irritation almost always. Draw three or four quarts of blood: rather be content with this, and repeat the same, than abstract a larger quantity. Give purgative or alterative medicine: administer daily such a ball as this:—

Take of Calomel.....	3ss	
Barbadoes aloes (in powder)	3iss	
Digitalis (in powder)	3ss	
Venice turpentine.....	3ij	Mix into a ball.

Whenever the ball produces purging, omit it for a few days, and then give it again every day, or every other day, according to circumstances. Apply a strong blister to the throat; and likewise—should there appear any reason to suppose disease exists in the windpipe—extend it along the front of the neck, in the course of the pipe. As soon as one blister is worked off, apply another; or else insert setons through the parts. The latter is an excellent practice where we are desirous of keeping up continual irritation.

In regard to all this treatment, however, let it be observed, that,

although it holds out a prospect of success in a case wherein the roaring is but recent and manifestly traceable to some inflammatory affection which is still probably—concealed under the form of an occasional cough, a shortness or pursiness of breath, or some slight fever in the system—lurking about the air-passages, it will not and cannot prove of any avail in a case in which the roaring is, from its duration, become established, and where all remnant of inflammatory action has, for some time past, disappeared.

EXCISION OF THE CROSS-BANDS OF COAGULABLE LYMPH.—

It is said—for its truth I cannot vouch—that, once upon a time, a veterinarian in performing the operation of bronchotomy on a roarer had the good luck to cut against one of these bands, and so, like a prudent man, excised it, and thus fortuitously achieved a cure on the horse whom he had anticipated but to relieve. The circumstance was eagerly caught at as opening a new and successful field to experimenters, and the windpipes of roarers were most mercilessly slit open in search of similar bands. Alas! so many disappointments followed, however, that the novel operation was abandoned for the introduction of a practice which, if it does not offer the same glittering prospects, is, at all events, free from evils that *may* accrue from cutting and slitting the windpipe. In fine, this is an operation which, considering the extreme rarity of the cases wherein it is applicable, no man is justified in performing, unless he can practise auscultation in that perfection, that he can positively say, bands of lymph *do* exist, and precisely point out the place of their existence.

TREATMENT OF ROARING FROM TIGHT REINING-IN.—One cannot rationally entertain hopes of cases of even this kind, of any considerable duration. In time, as we have seen, not only does the distortion of the larynx and windpipe become permanent and irremediable in consequence of the parts losing all their wonted tone and elasticity, but changes of their structure take place: the muscles shrink and waste away; and the cartilage itself becomes altered—probably converted partially into bone. Should the subject be a harness-horse, and have been in the habit of being tightly borne up, let him, for the time to come, be driven without any bearing-rein at all; and, in addition to this, when in the stable, let him be bitted

to the side chains or straps, for a couple of hours, twice a-day, in such manner that his head may be kept continually elevated, and his nose projected forwards *à la Russe*. This is also the best plan we can pursue in a case where the mischief has been occasioned by any injurious constraint of the head in breaking, biting, or lunging the horse.

I know of nothing more that can be done by way of treatment for roaring, unless we choose to try iodine : it may either be given internally or employed as an ointment, or used in both ways. I have not yet myself had an opportunity of making trial of it.

HOPELESS CASES.—As such, in general, may be regarded all cases of long duration, arise from what causes they may. Also such as there appears any reason to believe are hereditary, or dependent upon an original malformation of parts. Cases of distortion are equally irremediable, when the distortion has existed so long as to destroy the original form and properties of parts, and in their place to have established fresh ones. Such can only be benefitted by

THE FRENCH TREATMENT, which consists in the performance of bronchotomy, or tracheotomy, as they more properly call it. They make a large aperture, and use a proportionably large tube*, so constructed and adapted that the animal can not only freely breathe through it, but do his work, and even gallop, with it in his neck. In this manner, very bad roarers have been known to have been kept exempt for two or three years, and at work all the time.

BRONCHOCELE.

By *bronchocele* is meant hypertrophy, or a state of enlargement, of the thyroid gland†. It is a disease which is rarely seen in horses. I have met with only three or four instances. In cattle and sheep it is likewise uncommon ; but among swine and dogs it is comparatively frequent ; and still more so, it would appear, in our own species, and in women in particular about the age of puberty : a circumstance which has induced surgeons to believe it to

* The tube I recommend will be found described in the 1st vol. of Hippo-pathology. It is sold by Long, 217, Holborn.

† For a description of this gland consult my "Anatomy of the Horse."

be connected with uterine derangement. It is an old and well-established observation, that certain countries and localities are favourable to its production. In England, Derby and Nottingham shires have obtained this repute; on the Continent, Switzerland, the Tyrol, Valley of the Rhone, and others; and to that extent to lead us at once to the conclusion, that influence of soil, or climate, or both, must have much to do with its production: an influence to which, we are assured by the French—who call it *goître*—animals are more or less amenable. Old medical writers ascribe its appearance in particular persons to that convenient *fons et origo*, “a scrofulous habit.” Of late years the disease has been thought to be hereditary; and so strong has appeared the evidence of this in dogs, that Mr. Youatt’s forcible expression on this point is, “I am quite assured that it is hereditary.”

IN HORSES we pretend to know nothing further about it than that a tumour, seldom of any great magnitude, makes its appearance in the throat, just below the part we grasp to excite coughing, either directly in front or inclining to one side, having a circular or an ovoid form, and feeling soft and puffy and moveable, without any flinching or sensibility being evinced by pressing or squeezing it, and without being the occasion of the slightest inconvenience or disparagement, save what may be considered to arise from its being regarded as an eyesore. The first case I saw occurred in the year 1822. The tumour was about the size of a hen’s egg; but I remember my father telling me at the time that he had seen one before in which it was much larger.

TREATMENT.—Should the tumour, on account of its volume, become the subject of medical treatment, I would recommend a trial of iodine. Supposing the case be recent, it might, in the first instance, be advisable to give a brisk purge; after which I would administer, daily, a ball composed of a drachm—which may be increased to two drachms—of iodide of potassium, and, at the same time, rub into the swelling as much of the following ointment as is equal in bulk to a small walnut:—

Take of Iodide of Potassium.....	ʒiiss
Hog’s Lard	ʒj

Should the case be a chronic one, and the tumour in consequence of its duration have become firm and hard in its feel, and the iodine fail to influence it, I would apply strong blisters upon it, or, as an ultimate resource, pass a seton through it.

NASAL POLYPUS.

POLYPUS is the name given to an excrescence or tumour growing from a mucous membrane by a narrow part or neck, called its *pedicle*. It is a very rare occurrence in horses. Never having had a case myself, I have nothing of my own to offer on the subject. A very good article on it appeared in "*The Veterinarian*" for 1831, under the signature of *T*, from which I extract the greater part of what follows:—

THE TRUE POLYPUS is attached to mucous membranes, and is usually found in the nostrils, the pharynx, the uterus, or the vagina. It usually adheres to some portion of the superior-turbinated bone, or it has come from some of the sinuses connected with that cavity. It escaped, while small, through the valvular opening under the superior turbinated bone into the cavity of the nose, and there attained its full growth. The polypus of the quadruped is not the compressible elastic fungous one (*polypus elasticus*) which is described by writers on human surgery as occupying the nostrils of their patients. The bleeding polypus is not known; but the small portion of bloody fluid that often appears at the nostril proceeds either from the vascular mucous membrane with which the tumour is surrounded, or from the membrane of the surrounding cavity abraded by long and violent pressure.

STRUCTURE AND ORIGIN.—Some polypi have a fibrous or almost cartilaginous structure, and others appear to be composed of various little tumours agglutinated together. They are formed originally under or within the membrane by which the nasal cavity is lined; but no better account can be given of the cause of their appearance than that of tumours in other parts of the body.

PEDICLE.—By some means, probably the increasing weight of the tumour, and being in a dependent situation, it is gradually detached from its base, and forces with it the soft and easily distensible membrane of the nose. As the polypus continues to descend, this portion of membrane is further elongated, and forms the pedicle or root of the tumour:—a root it is not, for it is no continuation of the substance of the tumour, but a mere duplicature of its investing membrane. How this may be with regard to the fungous bleeding polypus of the human subject, I am not able to determine. The twisting of the pedicle, and tearing it out by the root, may be a good practice with re-

gard to the human being, but cannot be justified where the pedicle is a mere cord by which the polypus is suspended, and forms no continuation or part of its substance.

SHAPE.—The polypus, when it hangs free in the nasal cavity, is usually of a pyriform or pear-like shape. It is that form which it would naturally assume from the gradual distention of the membrane, pressing on every side of the tumour, and opposing its chief resistance at the base.

Its **WEIGHT** varies from a few drachms to three or four pounds.

SYMPTOMS.—Some difficulty of breathing, apparently arising from obstruction of some of the air-passages. A discharge of mucus from one or both nostrils, sometimes highly tinged with blood. Occasionally, pure blood runs from the nose; and there is felt, by the hand placed before the nostrils, an unequal rush of air from one or both of them. Inspection in a full light discloses, higher or lower in the nostril, the rounded base of a polypus.

CAUTION.—The veterinary surgeon must take care not to mistake the cartilaginous prolongation of the anterior turbinated bone for a polypus, when he sees it spread upon the false nostril, and enlarged and prominent from the general thickening of the mucons coat; nor the prolongation of the posterior turbinated bone, not quite so much developed; nor any rounded clot of blood which may have escaped through the valve under the posterior turbinate, and be retained there by the separated fibrine. This has been done by men of some repute.

TREATMENT.—The horse must be cast, and the head fixed in a position to take the greatest advantage of the light. The operator must then try to lay hold of the polypus with his fingers or the forceps, or (for these tumours do not possess much sensibility) the tenaculum. If he cannot fairly get at it by any of these means, he will let it alone. It will continue to grow; its membranous pedicle will become lengthened, and the polypus will descend and be easily got at. I do not know whether this polypus in horses—like the one in men—is influenced by damp and dry weather, so that on one day it is more prominent than on another.

OPERATION.—In bringing down the tumour for operation we must not use any great force. The pedicle being but a duplicature of skin, and not a portion of the polypus itself, may be divided any where. Besides, force would endanger the delicate gossamer fabric of the turbinated bone. The tumour brought down must have a ligature passed round its pedicle as high up as it can conveniently be placed. If the polypus can then be returned to the nose, the animal will suffer very little inconvenience; and in a few days it will slough off, and the pedicle will contract and gradually disappear. If it cannot be returned, after applying the ligature securely, we may excise it immediately, though it would be better to wait a few hours first. Should bleeding occur, the actual cautery may be resorted to. In very bad cases it may be necessary to slit up the ala or side of the nostril. The false nostril, however, had better not be cut through; it is so difficult to retain it after-

wards for union. The incision should be carried along the lateral edge of the nasal bone, beginning at its apex, which will give a flap convenient to turn down.

A BLEEDING FUNGUS POLYPUS might require being detached by the forceps or by torsion. In operating thus, let there be no pulling at the root. The pedicle will then give way at the weakest part, and there will follow no hemorrhage, no lacerated membrane or detached bone, to produce malignant ulcer or cancer or glands. Simple excision is never permitted, on account of the impossibility of stopping the bleeding without the cautery, whose application within the nose is both difficult and dangerous.

VATEL suggests plugging the nostril to arrest any hemorrhage after the operation, and, instead of slitting up the nostril, to trephine the bone. To this latter, however, there are many serious objections.

GOHIER relates a case of a horse who had in his left nostril a polypus as large as a turkey's egg, of a greyish colour and glossy surface, too high up to be reached with the finger, which prevented his breathing on that side, and gave rise to offensive effluvium, to enlargement of the lymphatic glands, but not to roaring. Gohier slit up the nostril, and, with an iron rod with a notch upon its end, contrived to inclose its neck in the slip-knot of a ligature; in drawing this tight, however—which was of necessity done in an oblique direction—the pedicle was cut through. Little hemorrhage succeeded, although the tumour weighed twenty-four ounces. The slit nostril was sewn up, and cold water injected into its cavity. A copious discharge from both nostrils followed, with swelling of the lymphatic glands. This was met by proper treatment, and in fifteen days the patient was sent out of the hospital. Since then, Gohier heard that the running had re-appeared.

CHABERT, in his "Veterinary Instructions," relates the following:—A horse in a cavalry regiment had been gradually losing flesh, and was quickly and painfully blown at every little exertion. Fetid matter began to run from his off nostril, and the gland correspondent enlarged. The horse was supposed to be glandered by the sergeant-farrier,—there being no veterinary surgeons then in the French service,—and was treated accordingly. After a time, to the confusion and astonishment of the man, a fleshy substance began to appear in the nostril, and which rapidly increased in size. At length a great mass protruded, and the farrier cut it off. No benefit followed; the nostril was still stopped, the breathing laborious, and the horse daily became thinner and weaker. After the lapse of a twelvemonth the case attracted the attention of M. TEARS, the surgeon of the regiment. He cast the horse, slit up the nostril, when he not only found it completely filled with polypus, and the septum narium bulging into the other division of the cavity; but, from long continued inflammation and pressure, it adhered to the membrane of the nose in so many points, and so extensively, that it was impossible to get round it, or move it. He contrived, at length, to pass a crucial bandage around it,

and it was torn out by main force. Four considerable portions of the turbinated bones were brought away with it. The hemorrhage was excessive: he however filled the nostril completely with tow, and brought the divided edges of the false nostril together by sutures. In three days they were all torn out by the incessant attempts of the animal to get rid of the obstruction; but the horse eventually did well. The polypus weighed two pounds seven ounces.

CHABERT, in a case which he had himself, of very large polypus, was obliged to make a hole in the frontal bone, which he contrived to cover afterwards with a leathern shield, attached to the front of both bridle and head-collar. For a long while after recovery the horse ran in a cab.

RIGOR relates a case in which the tumour remained stationary at first for a long time, and then suddenly took to growing. At last it became such a size that it occupied the whole cavity, pushing the septum into the other nostril, displacing the bones, and threatening suffocation. The nostril was slit up; the pedicle cut asunder close to the bone; and the cautery applied to arrest the hemorrhage, and *prevent the reproduction of the tumour*.

A CURIOUS CASE came some years ago before one of the Provincial Courts of France. A farmer purchased a four-year-old horse at a fair. A slight discharge was observed from one nostril, with some thickness of breathing. This was not thought extraordinary, as it was the *strangle age*. The horse became worse, and at length could not be used. The case was tried. A veterinary surgeon deposed that there was a polypus in one of the nostrils, but so high up that it would have escaped his observation had he not been particularly directed to it, and that he believed it existed at the time of purchase. On this the court determined that the horse should be returned, although the term of warranty had expired, on the ground that it was one of those obscure cases of unsoundness, the existence and nature of which could not have been discovered within the prescribed time.

HEMORRHAGE FROM THE NOSE.

EPISTAXIS—as the flux of blood from the nose is technically called—occurs now and then in horses; and when it does happen, the blood commonly comes but from one nostril: a circumstance which of itself may be regarded as an important distinction between epistaxis and *hæmoptysis* or hemorrhage from the lungs. There may be a stream of blood, or it may issue only drop by drop. In either case it is very apt to collect within the chamber of the nose and about the nostril, where it occasions irritation, and causes the horse to snort and blow out clots of blood; and thus, by opening the sources afresh, is produced augmented hemorrhage. As to the blood

itself, its character is mostly arterial, its colour being generally a bright scarlet.

THE CAUSE of the hemorrhage is sometimes constitutional, sometimes local and accidental. When the bleeding cannot be ascribed to any local irritation or injury, it is said to be *spontaneous*; under which form it may, in general, be referred to a surcharged condition of the capillaries of the Schneiderian membrane, either from determination of blood to the head, or as the consequence of general plethora of the system. The injected reddened condition of the conjunctive and Schneiderian membranes will go far to confirm this view of the case; added to which, there may be observable some unusual action of the carotid and temporal arteries; also, the subjects themselves will be found to be in high condition or loaded with fat, and in insufficient or irregular work. Troop-horses, brewers' horses, and horses kept for pleasure, are most liable to spontaneous hemorrhage. We hardly see it in very young horses, or in such as are poor and hard worked. The other form, *traumatic hemorrhage*, that which arises from injury, or wound, or lesion, occurs, perhaps, the oftenest. A blow upon the nasal bones, either from a stick or the but-end of a whip, any contusion, in fact, will be very likely to excite hemorrhage, and, should a vessel of any magnitude become ruptured or wounded, the flux may be such as to endanger life; though I never myself saw such a case. D'Arboval says it may be occasioned by the pressure of the collar in laborious draught. I have often seen bleedings from the nostrils in the latter stages of glanders, but never to an extent to beget alarm.

DOES EPISTAXIS EVER PROVE FATAL?—I never witnessed, nor do I know of any report of, such a case myself: D'Arboval, however, informs us that, should the animal die, on exploring the chambers of the nose, we shall find more or less blood collected, and some of the clots so changed in appearance as to resemble pus.

DIAGNOSIS.—When we see hemorrhage from the nose, our first duty should be to inquire into its source; whether it come from the nose simply, or from those important organs, the lungs. In hæmoptysis the blood commonly issues from *both* nostrils, and comes away *frothy*, and in some cases mingled with *mucus*. Again,

bleeding from the lungs is apt to create a great deal more irritation : the horse is uneasy, breathes hard or quick perhaps, and sometimes coughs violently ; and should he cough, will throw blood up into his mouth ; and the more the head is depended, the readier will the blood flow out.

OUR TREATMENT must be such as is adapted to the circumstances of the case. In slight hemorrhages none other but repose and abstinence will be required. Should the hemorrhage be considerable, and appear to result from plethora, the grand object will be to lower the heart's impetus. We must, therefore, bleed largely, and from a large orifice, in the vein. A purge will operate advantageously in two ways:—first, in inducing a state of nausea; secondly, in tending to diminish the quantity of blood in the system. The best local treatment is dashing buckets of very cold water at the head, or the application to the sides of the nose of ice or snow, when either can be procured. Should the blood issue from one nostril only, that cavity may be plugged up with tow dipped in a solution of alum ; or, should the patient not be able to bear the plugging, the same—which I believe to be the best styptic—solution may be thrown up the nostril with a large-mouthed syringe.

In a traumatic case the injury—whatever it be, wound or contusion—will require our first consideration, as being the occasion of the hemorrhage. In so far as concerns the bleeding, providing the loss of blood is not such as to create any alarm, the patient will be benefitted by it, in having to undergo less febrile and inflammatory action afterwards ; should it, however, continue beyond this, we must inject and plug the nostril, and apply sudden cold, and bleed or nauseate, or both, according to circumstances. Such measures as slitting open the nostril, and applying the actual cautery, or a ligature, supposing the vessel could be reached, are rarely, if ever, necessary.

SECTION. VII.

DISEASES OF THE LUNGS, PLEURA, AND DIAPHRAGM.

Causes of Pulmonary Disease—Diagnosis—Percussion and Auscultation.

CONGESTIVE PNEUMONY	PLEURO-PNEUMONY
INFLAMMATORY PNEUMONY	HYDROTHORAX
SUBACUTE PNEUMONY	ADHESIONS
CHRONIC PNEUMONY	HEMORRHAGE FROM THE LUNGS
CONSUMPTION	EMPHYSEMA—BROKEN-WIND
ACUTE PLEURISY	SPASM OF THE DIAPHRAGM
CHRONIC PLEURISY	RUPTURE OF THE DIAPHRAGM.
EFFUSION	

PULMONARY disorders in horses bear even a larger proportion to the number of other maladies than in our own persons. Putting accidents and lamenesses out of the question, we shall find a large majority of the cases presented to us for treatment to be diseases of the pulmonary apparatus; and the most fatal of them to be those which attack the lungs and their enveloping membrane, the pleura. These diseases also evince in horses a rapidity of destructive course, which is not the case with them in men. In our bodies they are rather apt, by slow degrees, to bring their victims to their end; while they will hurry horses off even after but a few hours' duration, and in despite, too, of every measure which medical skill can devise. This, of course, on our part calls for corresponding alertness and decision in our therapeutics; and the more so, seeing that it is not only required of us to save life, but to save organs, and in that normal state, too, in which they may be so fit to carry on their functions that the animal can do his work nearly or quite as well as ever. If he is left with imperfection in his wind, I am afraid we shall derive but little credit by the cure, even though we may have been the means of preserving life.

PREDISPOSITION to pulmonary disease is observed to exist in horses of certain age, form, and temperament. Young undomesticated horses are incomparably more subject to them than such as are aged and seasoned. And such as are high-bred and tenderly reared, and have light carcasses, long legs, flat sides, and breasts so narrow that both fore-legs seem as though they "emerged from one hole," and possess thin skins, are indisputably more susceptible than those of a different breed and opposite conformation.

THE CAUSES OF PULMONARY DISORDERS will, in a general way, be found in the air horses breathe and in the work they perform: in fact, they may be said to date their origin from the time the animal is taken into the stable and made the servant of man—in one word, from *domestication*.

THE AIR the horse is compelled to breathe while confined in his stable may be *cold* or *heated*, *moist* or *dry*, *pure* or *impure*, considered in relation to the atmosphere out of doors. There can be no doubt that either excess of temperature—cold or heat—must prove excitant to the membrane lining the pulmonary passages; and yet it is a notorious fact, that horses usually enjoy vigorous health in frosty weather. Cold with damp, however, has certainly an unfavourable operation. Wet springs and autumns are commonly productive of a good deal of sickness. Is this to be ascribed to any direct effect upon the air-passages, or is it to be attributed to some operation upon the skin?—and particularly since these are the moulting seasons? In the latter case the lungs become secondarily or sympathetically affected. Even here, however, we appear to require the presence of some stimulant—such as heat or foul air—before disease will shew itself; for horses out in the open air during such insalubrious seasons, rarely, if they do at all, contract the prevailing malady. In a general way, and in regard to its direct operation upon the bronchial membrane, cold must be regarded as a predisponent to disease; and not so much cold by itself, as cold with humidity, or even a particularly drying cold: the probability being, that the effects are not owing simply to any sedative operation the cold may have on the membrane, but also to the effect produced upon

it as a surface emitting and constantly covered with a mucous secretion. Cold, then, with either more or less moisture than is usually contained in the atmosphere, being considered as the predisponent, our next inquiry must be after the immediate excitant. The late Professor Coleman was in the habit in his Lectures of attributing great influence to the foul air engendered in stables by effluvia from the dung, urine, and breath; and perhaps, in combination with heat, there exists no more fruitful source of disease of the pulmonary apparatus: but I have my doubts whether foul air without heat is often productive of such effects. At the time I did duty with the army in the Peninsula, I remember well that most of our stables, or places used as stables, were dirty and filthy in the extreme, being either without any pavement at all, or so badly paved, that they were full of holes; and there was nothing like drains or sewers to carry off the urine; and that they were in many places all but roofless, and in most places in a dilapidated condition. In these situations the horses and mules of the army bred farcy and glanders and mange, but very rarely bronchitis or pneumonia or pleurisy. This corresponds with what is observed to be the effect of foul air on the human subject, viz. that it tends to engender *malignant* rather than common inflammations, of which typhoid, gaol, and putrid fevers are examples.

COLD—or wet producing cold—applied to the surface of the body may, however, by causing a reflux or congestion of the blood inwardly, have a sort of direct operation in producing pulmonary inflammation. There can be no doubt about the correctness of this reasoning, nor of its occasionally happening in practice; but I do not, myself, believe that it happens near so frequently as is represented; else would many more racers and hunters, and post and coach horses and others, fall victims to pulmonic disease than now are known to do. Our surprise is, how the poor slave who is galloped one hour until dripping with sweat and nearly exhausted, and the next stands tied to a post, exposed to the cutting blast or pelting shower, while his master is engaged in business or regaling himself, can possibly escape; for escape he probably would, even to the last, were it not that he had to encounter when he shall have arrived home—what to him may seem most

comfortable, but what in reality is his greatest enemy—the hot foul stable.

OVER-EXERTION OR HARD WORK may induce pulmonary inflammation. The horse whose case we have been imagining, may, the moment he arrives home, or very shortly afterwards, experience an attack of pneumony. Or, I will suppose another case, a very common one:—A gentleman shall purchase a four or five-year-old horse of a dealer, at the time in fine, fat, sleek condition. Through ignorance or inexperience on the part of his new master, this horse is directly put to work, and immediately afterwards is attacked with pneumony, of which he dies. The gentleman brings an action against the dealer for the recovery of the value of his lost horse, and the result has been that he has obtained it—most unjustly however, for, in all probability, the animal was in perfect health and soundness at the time of sale, and has lost his life entirely from the mismanagement of his purchaser; though, at the same time, no other blame than want of knowledge could morally be imputed to him. It was formerly the custom in the army to put all recruit-horses to severe work in riding-schools, and the consequence was, numbers became lost to the service: now, however, that a mild and progressive system of manege is practised, the mortality arising from this cause has quite disappeared. Any act of sudden or violent exertion, such as a “splitting gallop,” or a “burst,” is likely to cause a congested state of the lungs, under which the horse sinks asphyxiated, and in that condition, unless immediately relieved, dies. This is not inflammation, but is what is very apt to be followed by inflammation, supposing the animal to survive the original shock.

INJURIES, mechanical or chemical, may prove the cause of pulmonary disease. It is possible that the enveloping membrane, or even the parenchymatous substance, may suffer preternatural extension and laceration from violent and convulsive efforts to breathe under certain bodily exertions, such as racing, leaping, plunging, &c. Contusions from falls or blows upon the side might injure the pleura; fractures of the ribs, or sharp instruments, may wound the pleura or lung. And as for injuries of a chemical nature, in this light may be viewed the several pollutions the atmosphere of

the stable receives from the effluvia of the dung, the urine, and the breath of other horses. Ammoniacal gas is said to prevail in the effluvia from these excretions; and, therefore, there can be no question about the effects of such an atmosphere being highly excitant and creative of inflammation.

DIAGNOSIS.

Upon the diagnosis will the treatment depend.

In the study and observation of diseases of the pulmonary organs our chief aim must be to attain such intimate knowledge of them as will enable us not only to make the necessary distinctions between them, but to so far ascertain the nature of each as to render us competent to treat it to the best advantage, and at the same time give an opinion to be relied upon in regard to its result. Certain symptoms are common to almost all these disorders: that, however, which is of all, if not the most common, the most important, is altered or disturbed respiration. And there are so many degrees and kinds of alterations in the breathing, that they of themselves, by attention on our part, may be rendered of great value to us in the formation of our diagnosis.

RESPIRATION in health is shewn by a placid, uniform, regular, and hardly perceptible motion of the flanks, at the rate, according to Delafond, of from 10 to 12 breathings a minute in young horses, from 9 to 10 in old; according to Professor Sewell, of from 4 to 8. If horses in the stable are referred to, I cannot but regard the latter standard as much too low. Delafond has given us what he calls a "synoptical table of the different kinds of respiration," from which we may gather some useful practical observations, without pretending to adopt all his finely-drawn distinctions. He makes a division of the different kinds of breathing, relatively, into

1. Acceleration or retardation.
2. Depth of inspiration.
3. Difficulty of performance.
4. Modifications of these.
5. Accompanying sounds or noises.

FREQUENT RESPIRATION is common to all pulmonary disorders and sympathetic fevers; quick breathing denotes sharp pains in the chest or belly; slow breathing is perceived in cerebral affections and pulmonary emphysema.

DEEP INSPIRATIONS betoken advanced hydrothorax; short ones, which constitute quick respiration, are signs of pleural or peritoneal pains.

DIFFICULT OR LABORIOUS RESPIRATION characterizes acute laryngitis and bronchitis, pulmonary congestion, and all those cases in which obstacle in the air-passages, or other impediment, embarrasses the breathing.

UNEQUAL RESPIRATION has one inspiration deep, another not. It becomes IRREGULAR where the intervals are unequal; INTERMITTENT, when the breath is held or suspended; INTERRUPTED, when that suspension takes place in the middle of an inspiration or expiration; INTERSCINDED, when suddenly arrested and converted into a convulsive action of the flanks or catching of the breath. This last is present in broken wind, but it is in particular characteristic of pulmonary emphysema, and diseases of the heart and pericardium.

THE EXPIRED AIR is also worthy of our observation, as a farther test of the nature of the disease present. In all animals its temperature—ascertained by holding the hand before the nostrils—is a little below that of the body. In frequent respiration, sympathetic fever, bronchitis, and acute pneumony, the breath will be *hot*. In all chronic diseases, and particularly in tubercular phthisis and in pluerisy, both acute and chronic, it will be *cold*. The breath, inodorous in health, may, under disease of the air-passages or lungs, acquire certain odours. In pharyngeal affections, in caries of the bones, and vomicae discharging through the bronchial tubes, the breath becomes *fætid*; but in gangrene of the lungs, even *putrid* in smell.

PERCUSSION AND AUSCULTATION.

For years past both these means of exploration of the cavity of the thorax have been practised by veterinarians as tests of the presence of water: it is only, however, since the new and brilliant lights thrown upon the subject by the immortal Laennec that we, in common with surgeons, have derived much real advantage from them; and even now it is to the practised hand and ear alone of the man of accurate observation and multifold experience that per-

cussion and auscultation will yield their full products. On this account I shall prefer giving the practice of a French author, Delafond, who appears to have had, and to have profited by, extensive opportunities of observation, to relying upon any thing I might have to offer of my own.

NASAL CAVITIES.—The ear, applied to the nostrils of horses, even during repose, recognizes such a sound as condensed air streaming through some hollow tube would produce; but through the parietes of the nasal chambers, or the sinuses of the head, no sound whatever can be detected, either by the ear or the stethoscope; unless after exertion, and then a sort of snoring sound is heard in the former, while in the sinuses a soft murmur only is audible. A tumid condition of the Schneiderian membrane gives rise to the sound of thick wind, which, augmented, becomes whistling; and this may exist either on one or both sides. Sounds emanating from the larynx, windpipe, or bronchial tubes, or even from the recesses of the lungs, sometimes retain their force to that degree within the nasal chambers as to lead us to believe they arise there. Such mistakes are easily corrected by applying the ear by turns to the larynx, neck, and chest, the sound being greatest opposite to where it is produced. Snorting, which may be excited at any time by momentarily closing the nostrils, and which is occasionally thus produced to cause the ejection of matter from the nasal chambers, may be put in practice by way of further testing the seat of sound.

THE SINUSES OF THE HEAD, tested by percussion, either with the finger doubled, or with a key, or a piece of wood, or, what is better, with a small hammer and a light wooden shield interposed, yields in the young horse but indistinct resonance; the sound is plainer in the adult, but loudest of all in the old: a difference no doubt ascribable to the changes the sinuses undergo with age. As the resonance of the nasal chambers is diminished by the presence of polypi, or the accumulation of pus, so is that of the sinuses by even but a small purulent collection. Purulent repletion completely deadens sound. At the same time, percussion becomes painful, and the frontal bone often convexed.

THE LARYNX, in a state of health, yields but a faint sound to the ear. Under disease, however, we may with Leblanc regard the anormal sounds as consisting,—1st. In a *dry whistle*, which is the result of contraction, either from conformation or compression, or of physical or vital lesion of the recurrent nerve. 2d. In a *humid whistle*, the consequence of a tumid membrane covered with mucus, which is sometimes intermittent and accompanied with a gurgling noise or mucous *râle*, as in acute laryngitis. 3d. In a *râle* which may be either dry or humid, audible either at the beginning or decline of laryngitic inflammation.

THE WINDPIPE yields but little to our listenings, unless it be at the

superior and inferior parts. At its entrance into the chest, in the normal condition, is heard the sound of soft blowing, most prolonged during expiration. This respiratory sound, which is occasioned by the air returning from the bronchial tubes into the windpipe, we call, from its situation, *tracheo-bronchial respiration*. Frequency of respiration increases it. When liquids become effused into the bronchial tubes, the *mucous râle* is heard; and this is often accompanied by the *sibilous râle* and by the *sonorous râle*. In case of effusion of blood into the tubes, the *râle* is *spumous*.

THE THORAX affords no information to the feel, except in the case of pleurisy, and then the animal sensibly flinches from pressure sharply applied against the intervals of the ribs. Oxen will even moan from the pain occasioned. Neither *admeasurement* nor *succussion* of the chest produce any satisfactory results.

PERCUSSION OF THE THORAX means striking or tapping its sides with a view of judging, from the different sounds elicited, of the normal or abnormal condition of the organs within. The chest is said to *resound* when the vibrations raised by the shock extend throughout the chest and the contained viscera: on the contrary, when they appear confined to the place struck, it is said *not to resound*, or that the sound is *dull* or *dead*. The shock occasioning the vibration may be *direct* or *indirect* in its application, it being in the latter case conveyed through some intermediate body: hence the distinction between *mediate* and *immediate percussion*.

IN THE PRACTICE OF PERCUSSION, Leblanc makes use of a small iron hammer and a wooden guard or shield, the latter covered with india-rubber upon the surface to be applied to the chest. The sound thus produced exceeds that elicited by any soft body, such as the hand, against the equally soft skin. Such an apparatus, however, is apt to raise *two* sounds, and, in consequence, Delafond after many trials relinquished this—as well as another somewhat similar contrivance of his own—for the use of the hand simply. The parts to be sounded may be struck back-handed, with the knuckles; or both hands may be employed, one serving as the mediator. In fat animals, mediate percussion has advantages over immediate, not only on account of the external soft parts being thereby compressed, and themselves contributing to the sound, but also because we are able with more precision to test certain places where sound is but very indistinct, as around the cartilaginous borders of the ribs. Notwithstanding this, for the common purposes of practice, Delafond prefers immediate percussion, and practicable with one hand alone; and in performing it, he recommends attention to these rules, viz. First: Let the shock or stroke be given *perpendicularly* to the surface to be sounded: an oblique stroke would deaden the sound. Secondly: The ribs themselves are to be struck, and not the intercostal spaces, bones being better producers and conductors of sound than soft parts. Thirdly: In striking or tapping, the same force should be employed against every part. Fourthly: The same practice, in regard to manner and place, should be

strictly observed on both sides of the chest, in order that any comparisons made, may be correct.

PECTORAL SOUNDS will be found to vary according to the region of the chest percussed, the age of the animal, its condition, the full or empty state of its bowels, and its peculiar conformation and organization. Even when all these circumstances appear alike, resonance may be considerably greater in one animal than another. The chest of the horse admits of being percussed either upon the right or left side, from behind the shoulder as far as the last rib: with a view, however, of rendering the different sounds and their modifications distinguishable, it will be best to make some division of this space. Suppose we draw an ideal line, corresponding with the posterior border of the shoulder, and another in the direction of the last rib: the interval between these two fixed boundaries we divide by three horizontal lines into three equal parts, which we designate *regions*, superior, inferior, and middle. The superior region extends from the scapular line to the last rib, along the border of the longissimus dorsi, and includes the superior third of the superficialities of the ribs. The inferior region is marked by a line running from the elbow along the superior border of the pectoralis magnus, the insertion of the external oblique muscle and cartilages of the false ribs, and comprehends the inferior third of the said space. The middle region comprises the middle third, between these two lines.

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all, however,—what with the shoulder and the different muscles clothing the chest, and the cartilages of the ribs, which themselves afford little or no sound,—there is really not more than a third of the chest of the horse available for the purposes of effectual percussion; a fact which may very well explain the little advantage veterinarians have hitherto derived from the practice of it. The chests of old animals afford more sound than those of middle-aged, and these latter than those of young subjects; differences owing to diminished density of lungs and more stability of rib in the aged animal. Lean horses, or such as are empty-bowelled, afford more sound than fat ones, and such as have full stomachs.

We are not to suppose that it is enough to have made ourselves acquainted with the variations of sound of the healthy chest, in order to understand those of disease: much practice is required to estimate the value of sounds; and, after all, percussion itself is often insufficient, unaided by auscultation.

The resonance of the healthy chest may be augmented, diminished, or annihilated. It is augmented throughout the posterior lobes of the lungs when they are emphysematous. Effusion into one pleural sac augments the sound of the opposite one: that lung being compelled to admit more air, becomes more resonant. It is diminished during congestion, inflammation of the parenchyma, and tuberculous phthisis, when much of the lung is diseased. The sound is lost or becomes dead under effusions. This deadness may be on one or both sides, or be confined—as is ordinarily the case if the effusion be recent or inconsiderable—to the inferior part. It will increase or diminish according to the progress or diminution of the effusion. There is no measuring the effusion by sound; but we may throw it by the position of the animal into a place where percussion can easily detect it. M. Leblanc observes, that, taking want or deadness of sound to indicate the presence of water, the lungs are supposed to be permeable; otherwise, the deadness might as much depend upon density of the pulmonary tissue as upon the presence of water: still, there is a method of ascertaining from which it proceeds, viz. by placing the horse in that position in which the fluid will accumulate in the fore part of the chest, and then, should the posterior part still utter a dull sound, we may conclude that the lungs are hepatized. Furthermore, the dead sound may be partial, owing to local pulmonary condensation, circumscribed indurations, &c. &c.

AUSCULTATION.

Auscultation—from *auscultare*, to listen—consists in the perception, by the *mediate* or *immediate* application of the ear, of the different sounds manifested in the lungs, with a view of determining the normal or anormal condition of those organs, and, in the latter case, of aiding our opinion on their diseases.

MEDIATE AUSCULTATION is effected through the medium of the stetho-

scope ; *immediate*, through the direct application of the ear to the air-tube, or to the walls of the cavity of the chest. We prefer immediate to mediate auscultation for the following reasons :—1st, It is extremely inconvenient to apply ; 2dly, Supposing however, this were not the case, the stethoscope possessing no power of augmenting the sound, but only being the means of conveying it more directly to the ear, no advantage attends the use of the instrument ; 3dly, In human medicine the application of the ear would prove objectionable both to surgeon and patient, hence the adoption of the stethoscope : this is not our case.

IMMEDIATE AUSCULTATION.—During examination the animal should be kept quiet : his attention may be engaged by a little hay or corn. During the silence of the night is the auscultator's best time. The ear should be lightly and accurately applied. After all, should the sound remain indistinct, the respiration may be increased by exercise. The nasal cavities, the larynx, the trachea, and the lungs, are the parts to be auscultated ; and the modifications of the healthy sounds must be well studied in order not to confound them with such as arise under disease.

THE RESPIRATORY MURMUR is the sound heard within the parenchyma of the lungs during the entry and exit of the air, or rather at the time of their dilatation and contraction. The sound is difficult to describe : once heard, however, in a young well-bred lean horse, it is not likely to be forgotten : by exertion it may be rendered still more characteristic. In a state of health even, it will be found to vary with age, condition, temperament and breeding. In the young it is strongest. In human practice, its intense sound in infants is designated *puerile respiration*. Leblanc proposes in young animals to call it *juvenile*. In the aged it is hardly perceptible. The disposition of the pulmonary air-cells in the young, adult, and old animals, as shewn by Majendie, admits of satisfactory explication of these modifications. If in young animals the air-cells are more numerous and smaller, the sound ought to be stronger, from its entering into more places and through more circuitous routes. If, on the contrary, as in the old, the air-cells are larger and less numerous, there must be less dilatation, and more free passage of air, and consequently less sound. Laennec's explanation is different from this. He supposes the air-cells not to be capable of equal expansion in the adult animal from their sides becoming hard. The feeble murmur heard in pulmonary emphysema, wherein the air-cells are dilated or distended, favours our view of the question. In fat animals, cart-horses especially, and such as are of a lymphatic temperament, whose chests are covered with thick skins and abundance of cellular substance, the respiratory murmur is scarcely perceptible. In these cases, one must have recourse to exertion. Drs. Chomel and Beau, the last in particular, have a notion that the murmur is produced by the reflection of the shock the column of air receives against the fauces or glottis, back into the ramifications of the bronchia. But how can such a theory explain the supplementary murmur in one lung when the other is hepatized, unless it be by a sound more vesicular—stronger—in the healthy lung ; and in the superior part

of the lung when the inferior is no longer permeable to air. Besides, if tracheotomy is performed, and afterwards the nostrils sewn up, the murmur is still heard, although the animal is respiring through an aperture below the place where, according to M. Beau, the collision happens which produces the sound in question. The respiratory murmur will be found to vary according to the region of the chest auscultated. In the middle region it is heard distinctly behind the shoulder, increasing a little thence to the ninth rib, afterwards gradually decreasing to the last. Along the superior region the sound is quite distinct, as well as below and behind the cartilage of the scapula—behind a mass of fat lodged there in fat subjects. At this place we have invariably found the murmur louder than elsewhere, and we ascribe this to the passage of the air through the larger divisions of the bronchia, they being situated hereabouts: to it we give the name of *bronchial respiration*; making a distinction between it and the murmur. Along the inferior region, the respiratory murmur again becomes distinct enough from behind the elbow to the ninth rib; whence it diminishes to the seventeenth, and is there lost. The sound is the same on both sides, with the exception of the place on the left side which receives the heart's pulsation. We must take care not to confound the slight crepitating noise occasioned by the subcutaneous cellular tissue—which is called the *dry crepitous râle*—with the murmur. We must also distinguish the sounds of the bowels, which are characterized by their travelling about from place to place.

MORBID SOUNDS.—Disease modifies the healthy sound in such a manner that the murmur may become *diminished, extinct, augmented, attended or superseded* by other sounds.

DIMINISHED MURMUR.—*Accumulated mucus* within the large bronchia—as in bronchitis—may temporarily lessen the murmur, though it returns after expectoration. *Capillary congestion* within the parenchyma, before the onset of inflammation, equally occasions a considerable diminution of the respiratory murmur, speedily succeeded by the crepitous râle, should the inflammation continue. The diminution may be partial or general: rarely the latter. Acute enteritis and peritonitis, and in general all violent abdominal pains accompanied with a short quick respiration, occasion a notable diminution of the murmur. The same remark applies to all maladies about to end in death.

ABSENCE OF MURMUR is owing, in certain conditions of the lungs, to the non-penetration of air into the air-cells. This may be the result, 1st, of effusion into the parenchyma; 2dly, of induration; 3dly, of the presence and development of tubercles or other accidental productions; 4thly, of displacement and compression of the lungs by fluid effused into the chest. The loss of sound may be partial or general: it will return on the air-cells becoming permeable again.

AUGMENTATION OF MURMUR will accrue from accelerated respiration after exercise. Should this happen during rest, it is likely to result from dilatation of the heart or large vessels; in which case the sound is loud, and is heard throughout the lungs. Should the sound be louder in one lung alone,

or in places only of both lungs, it is owing to a morbid state of lungs; it being in the latter case in general referrible to non-permeability of certain parts of the organ. In such a case as this, it is probable that the healthy portions of lung in some measure compensate for the diseased parts, in admitting a larger quantity of air. For example, should the left lung become hepatized, the murmur in the right will become augmented; the same as partial hepatizations will cause an increase in the surrounding healthy parts of the same lobe. In all cases, this augmented sound takes the name of *supplementary respiration*. Again, the breathing becomes supplementary, and to a remarkable degree, along the superior regions of the ribs, in pleurisy affecting either both sides or one only, followed by effusion, at the time that the lung, still permeable, becomes pressed by the fluid into the upper parts of the chest.

RALES OR RATTLES is the name given by Laennec to such unnatural sounds as may attend the entry or exit of air within the air-passages. This term, which has been restricted in its signification to the noise heard in the wind-pipe just before death, must here be considered to apply in a general way to every anormal respiratory sound. In respect to the places whence proceed these pathological pectoral sounds, they have been classed as follows:—

Bronchial Sounds	{ Humid or Mucous Râle
	{ Dry Râle
	{ Bronchial Respiration.
Pulmonary Sounds	{ Crepitous Râle, humid or dry
	{ Sibilous Râle
	{ Cavernous Respiration.
Pleural Sounds.....	{ Gurgling or gurgling Sound
	{ Rumbling or grumbling Sound.

THE MUCOUS RALE issues principally from the bronchial tubes. It may be compared in sound to the bursting of bubbles of air caused by blowing through a pipe into soapy water. It is occasioned by the presence of mucus or other fluid. Its existence will be temporary or permanent, according as the mucus or fluids continue or not within the tubes: sometimes it becomes converted into the sibilous râle. Cough excited by compression of the throat, by occasioning the expectoration or displacement of the mucus, sometimes extinguishes these sounds; at other times it creates them. Frequently an accumulation of mucus within one large or several small divisions of the bronchia will cause suspension of the respiratory murmur in the interior of the lung, leading one to believe the lung is hepatized; one only need trot the horse, however, to dissipate any doubts of this kind. According as the air meets with resistance from the density of the secretions will the bubbles thereby created be large or small. Large bubbles ordinarily occasion a noise like the crackling of a pump-sucker falling after it has been raised. The same sound often accompanies the sibilous râle. It is observable in catarrhal bronchitis, when plastic mucosities abound. This sound is heard most dis-

tinctly behind the shoulder, opposite the large divisions of the bronchia: at times it is audible even at the termination of the windpipe.

THE MUCOUS RÂLE WITH LARGE BUBBLES becomes perceptible in simple bronchitis and in the second stage of broncho-pneumony. It is also created by the effusion of fluid into the bronchia in consequence of destruction of the cartilaginous rings, either from mortification or the bursting of vomices or abscess into the pipe, in which latter case the râle becomes *cavernous*. *Small bubbles* are formed when the fluid possesses but little viscosity, or becomes frothy, as in hæmoptisis, and the râle resembles the sound of frothing of beer in a large glass. Leblanc has given it the name of the *spumous râle*.

THE DRY RÂLE is a sound extremely variable in its nature, being at one time engendered within the bronchia, at another, but the reverberation of a sound originating within the pulmonary tissue. It is comparable to a growling bass tone, mingled with deep supplementary respiration. This râle, always denotive of dryness of the bronchia, is especially manifested at the commencement of acute bronchitis: its duration is always very short. By some the *sibilous râle* is classed among bronchial sounds: in our opinion it more properly belongs to the pulmonary sounds.

BRONCHIAL RESPIRATION is the loud dry sound emitted by the air within the bronchial tubes at such times as some obstacle prevents its free passage into the air-cells. The sound resembles that produced by a rush of air through a tube of tolerable dimension, or the noise of sawing, or such as is occasioned by the rubbing of two planks of wood one against the other. The detection of this sound is easy, and at the same time of importance, from its being indicative of alterations either in the lungs or pleura, tending to create obstruction in the vesicular tissue: there can be no doubt of its being occasioned by the rushing of the air in and out of the large bronchial tubes. It is less audible in expiration than in inspiration. In hepatization of the pulmonary texture the bronchial sound is heard along the line of demarcation between the hepatized part and that which is only yet infiltrated. It becomes augmented as hepatization proceeds, diminished with its absorption.

In effusion into the chest, it is as soon as the fluid has reached the height of the lower third of the cavity, and, consequently, the inferior border of the lung, from being inundated, becomes impervious to air, that bronchial respiration is discovered. And especially in pleuro-pneumony, when the lung is hepatized and maintained in the fluid by false membranes, is the sound distinct. In the horse, both in recent and chronic effusions, the sound is ordinarily heard upon the same level at both sides; but in dogs and ruminants it is audible but on one side.

Acute pleurisy at its commencement is likewise characterized by bronchial respiration. In this case it is synchronous with the small and short inspiration, and catching of the breath, owing to the sharp twitching pains the animal feels every time he dilates his chest; and it is accompanied with a general confused sort of noise which renders its detection extremely difficult.

PULMONARY EMPHYSEMA, in the latter stages, is also denoted by bronchial respiration, the murmur being hardly or not at all perceptible. Audible in inspiration, but more so in expiration, it has been divided into *ascending* and *descending* sounds. Almost always it is accompanied by both crepitous and sibilous râles.

IN CONCLUSION.—Bronchial respiration being a constant unequivocal sign of important pathological alterations, it is that to which the practitioner should give his most special and undivided attention..

CREPITOUS RALE.—Laennec has given this appellation to a sound which accompanies the respiratory murmur, and which he has compared to the crackling powdered salt makes when thrown upon some burning hot body, to the noise elicited by the inflation of a small dry bladder, or to that produced by the compression between the fingers of sound lung distended with air. It suffices to have heard it once not to confound it with the other râles; and besides, this râle is audible in inspiration alone, which at once distinguishes it from bronchial respiration. The crepitous râle has two modifications, important to be distinguished: it may be *dry* or altogether like the crackling of the bladder, such as we have described, or such as is produced by the inflation and compression of the cellular membrane of horned cattle. This is called the *dry crepitous râle*, or crepitation. On occasions, however, the crepitous râle possesses a degree of softness or humidity which renders it comparable to the cracking of a bladder slightly moistened. This is less distinct than the former, and has received the name of the *humid crepitous râle*.

THE DRY CREPITOUS RALE, OR CREPITATION, is observable in interlobular emphysema of the lung, in partial gangrene, at least in the parts surrounding the latter, and often in the extremities of the posterior lobes as well.

THE HUMID CREPITOUS RALE is heard at the commencement of inflammation of the substance of the lungs. Should all murmur cease soon after, it is a sign of parenchymatous induration; its return indicates the resolution of the induration; and should murmur be heard around a part impenetrable to air, it denotes either resolution of the circumference of the indurated part, or that an areola of inflammation had been set up. In this last case the crepitous râle often continues; in the former one, it ceases. This râle is likewise manifest in intense bronchitis accompanied with some slight parenchymatous inflammation: we have often produced it also in injecting an irritating fluid into the bronchia. It is a common occurrence for this râle to be indistinct; when it is so, it becomes necessary only to momentarily excite the respiration to render it more audible. Should we be asked the question, how this râle is produced, and where? we answer—without entering into any minute and useless explications—that its source is the minute divisions of the bronchia and the air-cells, and that its occasion is, doubtless, the difficulty experienced by the air in making its way through these small tubes to the air-cells; added to which, it may in part arise from the distention of the cells.

DRY SIBILOUS RALE, OR SIBILATION.—We have already observed, in speak-

ing of the dry and mucous râles, that these sounds were the result either of the collision of air with some obstacle in the bronchial tubes, or of its rapid expulsion out of the air-cells. The sibilous râle issues from the bottom of the air-cells, and constitutes a shrill, dry, hissing sound, more or less prolonged and permanent. This râle is heard in pulmonary emphysema, both vesicular and interlobular, with dilatation of the extreme bronchia; and particularly during deep and distressful expiration. Its resonance through the bronchial tubes gives it strength and duration. At the entrance of the chest the râle becomes a grave sound, in the larynx and nasal cavities a shrill one; and in the open air is audible enough at a distance from the animal. Its intensity, doubtless, depends upon the extent of enlargement the bronchial tubes undergo. Many beginners in auscultation are apt, in large animals, to confound this râle with the nasal, laryngeal, or bronchial sibilation: careful exploration of the chest will prevent this mistake; inasmuch as the sound will always be found to be accompanied by the dry crepitous râle, bronchial respiration of a very loud character, and by catching of the breath.

CAVERNOUS RÂLE.—This râle, as is indicated by its name, can only proceed from some anormal cavity or cavern within the substance of the lung, communicating with the bronchial tubes, and admitting air from them: this last condition being indispensable. Should the cavern contain any fluid, the air passing through it occasions gurgling or more or less ebullition, comparable to the noise produced by a current of air through a tube into a fluid in a vessel, from which it can only escape in part.

This rumbling, which itself constitutes the *cavernous râle*, is the more distinctly audible the more capacious the cavern is, and the nearer it is situated to the ribs. It is often accompanied by mucous and sibilous râles. When the fluid contained in the cavern comes to flow into the bronchia, and thence to be expelled by expectoration, the air, in passing into this cavity, ordinarily terminated by a cul-de-sac, should the cavity be near the ribs, gives to the ear an inordinately loud sound, called *cavernous respiration*. When the cavernous râle follows upon circumscribed absence of the respiratory murmur, it becomes the sign of distinction between the bronchial and parenchymatous structures under disease in that situation: this indication, in combination with such as are furnished by the discharges from the nose, and the air expired, may enable us to form some idea of the disease that has occasioned the cavern. One observation we would make here, to prove the importance of immediate auscultation, and that is, when the expired air is impregnated with the odour characteristic of gangrene, and the cavernous râle is distinct and circumscribed, we may affirm, during life, that such a lobe of the lungs is in this part the seat of an anormal cavity resulting from mortification. This râle is also one of the best indications we possess of morbid alterations in the lungs of our domestic animals.

PLEURAL SOUNDS.—When fluid becomes effused into the pleural sacs, we directly imagine that it will discover itself by a rumbling, or by undulation

during inspiration and expiration: observation, however, proves that this is not always the case—that, in fact, these signs become manifest only in certain states, as will be seen hereafter. We find an exposition of these symptoms in a case of hydrothorax published by M. Massot, which he recovered by tapping. “When the ear is applied,” says he, “beneath the sternum, a dull, confused, drawling sound is heard, something similar to the noise made by rolling a cask containing liquid.” This observation is confirmed by M. Dandrieu in a case of carditis, with water in the pericardium of a cow, narrated by him in the “*Recueil de Médecine Vétérinaire*,” vol. iii, p. 488. “I applied,” observes M. Dandrieu, “my ear against the left side of the thorax, and I heard a slight confused noise, which I presumed to be caused by a fluid already partly effused into the cavity of the pleura, and, perhaps, even into the pericardium.” M. Leblanc seems to confirm both these accounts, when he says, in speaking of pleural sounds, that “at one time, kinds of grumbling (as of the bowels) are heard; at another, spumous sounds, if I may so express myself; at a third time, a rumbling sound: the first and last are ordinarily heard towards the lower part of the chest, supposing effusion to have taken place.”

Experience has convinced me that the presence of fluid cannot with certainty be made out by these signs, except under two circumstances:—1st, when false membranes have been recently formed; 2dly, whenever gas becomes mingled with the fluid: whether it be generated by the fluid itself, be exhaled by the pleura, or get accidental admission into the cavity, the result is, that agitation produces froth, and then the spumous r  le, combined with rumbling, becomes audible at the bottom of the thorax, and the less the quantity of fluid, the louder the noise. Should there exist both fluid and false membranes, the sound becomes modified, approaching to rumbling, or rather to the gurgling of a bottle emptying itself while its neck is full, but much more feeble. This noise has always appeared to us to ensue whenever, with the effusion, there were present false membranes which had so formed or arranged themselves as to have small *areolae*, or cavities of various capacities, into which the fluid entered during the act of respiration. In every case of hydrothorax without false membranes, and the presence of gas in the cavity, that has come under our observation, even when the like was produced by the injection of warm water into the chest, with the precaution to suffer the admission of as little air as possible, we have on no occasion heard any sound produced by the fluid. Moreover, it has long been an established fact in human medicine, that no sense of fluctuation, either by succussion or by auscultation, is detectable, except when gaseous fluid is mingled with the liquid effused: a case, be it remarked, extremely rare.

Such are the sounds afforded by the respiratory organs in horses: those of men furnish still more on account of the voice, which the surgeon having the perfect command of, manages to render of the greatest service. The sounds denominated *broncophony*, *egophony*, and *pectoriloquy*, are all produc-

tions of the voice under various states of disease. In animals we lack this valuable aid.

We cannot conclude these observations on auscultation without remarking, in a general manner, that, though of themselves of great importance, they are not to be regarded as infallible: they should on all occasions be coupled with the ordinary pathognomonic symptoms; and by the two, considered together and relatively, ought the practitioner to be guided.

We must make ourselves well acquainted with the permanent existence of the different *râles*. Some sounds will be found to come and go, and become replaced by others quite of another character; or several sounds may exist at the same time. Notwithstanding all this, however, by patience, attention, and study, we shall be able, I think, to establish, in our explorations of the chest, sure diagnostics of pulmonary disease; our ear being previously well educated for the business. Practice will give us tact in auscultation, and perfection in the art will place us in a situation to estimate the advantages we possess over the person who refuses such aid.

PNEUMONY.

By pneumony—from the Latin, *pneumonia*—I wish to be understood to express, either the state of *congestion* or of *inflammation* in the lungs.

PATHOLOGY.—The lungs being organs at once peculiar and extremely varied in their structure, will be found to be subject to diseases, numerous compared with other viscera, and much more diversified in character. The bronchial tubes constitute one division of their structure; the air-cells a second; the bloodvessels a third; the parenchyma a fourth: and these four structures are again to be distinguished from the cellular tissue and the enveloping membrane. The prevalent disorder of the bronchial system, *bronchitis*, has already been considered: the present disease, pneumony, will be found to differ from that in being comparatively a painless one; the tissue principally affected, the parenchyma, being known to be possessed, either in health or disease, but of comparatively little sensation.

So obscure, indeed, are the symptoms of pneumony in some cases wherein the parenchyma is almost exclusively affected, that it becomes an affair of doubt in the mind of the practitioner whether the lungs be actually diseased or not: hence such cases have

obtained the appellation of the *insidious* or *obscure form* of inflammation of the lungs. Should the bronchia, however, participate in the inflammation—which is more generally the case—then such symptoms as characterize bronchitis will arise, and the seat of disease no longer remain questionable. Supposing inflammation to have attacked the parenchyma alone, the bronchial bloodvessels may be regarded as those principally carrying on the disease; but there may, and often does, take place, prior to inflammation, and sometimes without any consecutive inflammation, and especially after over-exertion, a congested condition of the large bloodvessels of the lungs: a case of which kind will shew other symptoms, and require a modified treatment, from one of actual inflammation.

DIVISION.—This difference in the pathology leads to the division of pneumony into the *congestive* and *inflammatory* forms or stages. The latter admits of further division into *simple* and *complicated*, depending on the accompaniments—both of which are common—of bronchitis and pleurisy; the one case going by the name of *broncho-pneumony*, the other by that of *pleuro-pneumony*. A still further division of inflammatory pneumony is required into *acute* and *sub-acute*; though these, of course, have reference but to degree or intensity.

THE SYMPTOMS OF CONGESTIVE PNEUMONY may supervene all at once, upon any act of sudden or violent exertion, or they may come on gradually. In the one case, the horse, in perfect health before being put to this violent effort—whatever it may have been, hunting, or racing, or over-fatigue of any kind—is now distressed for breath to that degree, that it is evident, unless speedily relieved, he must die. In the worst cases of this kind, the animal is all over in a tremor; a cold sweat bedews his body; there is no pulse to be felt; his extreme parts betray the coldness of death; his eye is frightfully wild, and, together with the boring of head and stupidity evinced by him, clearly denote the poor sufferer to be labouring under a species of delirium. Should this state of congestion come on in the stable, i. e. gradually, and some time after the cause is applied, the horse will shew it by at first appearing dull, and listless, and heavy-headed, and off his appetite; his respiration will gradually become more disturbed and oppressed,

indicating much more of labour than of pain. The pulse will be full and quick, but probably so feeble as hardly to be perceptible. The ear applied to the chest detects no sound: the usual respiratory murmur is lost. The extremities—the legs and ears—have a cold, death-like feel; and in extreme cases the mouth is cold also, and the pupils more or less dilated. Cold sweats supervene; no pulse is to be felt; the animal gradually sinks, and in convulsions and delirium dies.

BLOOD-LETTING is the only remedy to save a horse in this state. The surcharged and distended pulmonary vessels must be relieved: the event will greatly depend upon the celerity with which this is done, and upon the extent to which we have been able to effect it. A large orifice must be made in the jugular vein; though from this the blood will seldom issue in any other than a tardy stream down the side of the neck, treacly in its consistence, and almost black in colour. So inanimate is a horse in this state, that it is as much as one man can do to support his heavy head, while another holds the blood-can to his neck. Blood must, notwithstanding, be drawn until the patient shall begin to stagger from becoming faint: all hope of recovery being centred in this abstraction. Should he survive the paroxysm, the case will shortly resolve itself either into one of resolution or direct recovery, or into an attack of inflammation.

INFLAMMATORY PNEUMONY may supervene upon the congestive, or it may come on by itself. In the latter case it will commonly exhibit three stages, or sets of symptoms: though the first stage may be, and often is, either absent or unnoticed.

THE SYMPTOMS, in the first stage, will be such as are observed at the beginning of common fever and other inflammatory diseases: such as staring or erection of the coat, and cold extremities, followed, perhaps, by actual rigor; the horse "hangs his head" either in or under the manger, and has not eaten his last meal; has had for some days a short dry cough, which comes on when he is exercised, or after drinking; and is dull and dejected in countenance, and moves with great disinclination. To this succeed, fever, quickness of pulse and heat of mouth, and injection of the membranes of the nose and eyes: and now, in the second

stage, the breathing becomes disturbed, and the case quickly develops itself. The nostrils will be seen opening and shutting their wings; the flanks laboriously working up and down; for the disturbed breathing will be of a kind to indicate embarrassment or oppression rather than quickness or pain: whereas, in sub-acute cases, the flanks can hardly be seen to move at all; then it is that the nostrils become an important guide to us. The pulse, at the beginning, is accelerated, and commonly distinct; but, as the disorder proceeds, it is very apt to grow indistinct from fulness and oppression; from which, however, it recovers by loss of blood, and then again becomes perceptible, and often, compared to what it was before, possessed of strength. The ears and legs are colder than ever. The membrane of the nose is moist and reddened, and there is often to be perceived a sparing, yellow, slimy issue from one or both nostrils. The horse stands constantly in the same place and posture, often with his fore legs stretched out, and prefers having his head directed either to the door or to any open window there may be. He never offers to lie down; but from time to time casts a look backward at his heaving flank of a peculiar despondent character, which the experienced practitioner does not fail to recognize. The third and last stage is characterized by the respiration becoming quicker and more oppressed; the pulse also quicker, but less distinct; the coldness of the extremities continuing unrelieved; the membrane of the nose changing from red to a leaden hue; convulsive twitchings of the muscles of the surface; extreme uneasiness; lying down and rising again; reeling in his gait; haggard countenance; delirium; convulsions; death.

AUSCULTATION, according to D'Arboval, detects a crepitating humid *r  le* around the inflamed places, with a louder respiratory murmur than in other parts; whereas percussion indicates deadness of sound in the diseased parts, but resonance in others. There are cases, however, in which, from the inflammation being seated around the roots of the lungs, these tests are not present.

THE MORBID APPEARANCES exhibited by the lungs in this stage are, according to Rigot, an uniform arterial scarlet tint of the parenchyma, with a slight cast of yellow from the surface of any divided part: this he attributes to the exhalation of serosity into

the interstices of the parenchyma, in particular around the borders of the inflamed places. The lung has lost its elasticity and crepitating property, and has increased in weight and density; but still swims in water. Its cut surface is frothy also. This accords with my own observation.

A horse came under my care for pneumonia on the 19th of March, in whom inflammation ran so high that several blood-lettings, &c. were required before it gave way. He was discharged "cured" on the 13th of the following month—April. A week afterwards, the same horse returned with a locked-jaw, of which he died on the third day from the attack. His lungs were now examined. On one side they were found quite sound. On the other their substance was redder than natural, and there was slight interstitial effusion, augmenting their solidity, but not sufficiently so to sink them in water, or to warrant the application of the epithet "livery" or "hepatized" to them.

THE PROGRESS of pneumonia will vary according to circumstances. Generally speaking, in a few days the disease will reach its height, and in a few days more evince indications of either gradually abating, and at length disappearing altogether, or of having set in to produce consequences which are likely to end in the destruction of life.

THE FAVOURABLE SIGNS are, abatement of the embarrassed and quickened respiration; comparative distinctness in the beats of the pulse; return of warmth to the extreme parts, moisture to the mouth and secretion to the nose; return of appetite; the coat becoming smooth and soft; the animal lying down and taking his rest: all which is likely to be brought about by timely and sufficient evacuations of blood.

UNFAVOURABLY must be regarded symptoms the reverse of these. The unabated continuance of the inflammation will be denoted by the unrelieved state of the respiration, by the extreme frequency or indistinctness, or both, of the pulse, and by the gloomy aspect of the case altogether. Should the breathing become on a sudden quickened and embarrassed more than ever; the pulse grow small and weak and run up to a hundred or more; the legs remain cold; the mouth become cold; the eye acquire a peculiar desponding expression; the lower lip hang pendulous; the horse become uneasy; cast frequent and sad looks at his flanks, and move from place to place, or lie down and rise again almost immediately, or

paw occasionally,—we may make up our mind that the scene before us will not take long ere it close for ever. Many horses suffering from unrelieved pneumony, and particularly in the congestive forms of the disease, will maintain the standing posture to the very last, and then suddenly drop down dead.

THE TERMINATIONS of acute pneumony are resolution, stagnation or obstruction, mortification, hepatization, the sub-acute and chronic forms.

RESOLUTION means the return to health without leaving any material alteration of structure behind; and though they be comparatively rare, still, when proper treatment is early resorted to, many such cases do occur. Though a more common case, perhaps, is the one in which the lung, losing in part its elasticity and buoyancy in water, acquires increased weight, and density, and colour: all which may, however, after a time disappear, and still leave the case, in the end, one of resolution.

STAGNATION OF BLOOD consequent on the obstruction caused by the unrelieved distention of the bloodvessels, and their own inability to contract upon the column of blood, is the cause of death in such cases as sink during the congestive stage of pneumony. The accounts of horses dying in a few hours after attacks of what is miscalled “inflamed lungs,” are cases of this character, and are not inflammatory in their nature. Their lungs are found gorged with blood, very dark-coloured, and, where congestion has existed for some days, really lax and rotten in their texture, and sometimes changed to that degree to be, in fact, gangrenous: hence the description given of them by farriers and grooms, and such people, as being “as black as their hats,” and as “rotten as a pear.” The obstructed circulation through the lungs will account for the disorder we find manifesting itself in the brain, particularly in the last stages of congestive pneumony.

HEPATIZATION is the term we apply to the change the lungs undergo in consequence of inflammation, which renders their substance, when cut into, liver-like or *hepatic*: instead of presenting a pale pink, spongy, light, and elastic interior, we find them reddened, solidified, and become heavy and resisting; and, instead of floating in water, we find they sink.

M. Rigot has well portrayed this change. "The hepatized lung appears to have, and on occasions really has, acquired increase of volume: its tissue is close; it crepitates no longer on pressure; on being cut, it does not present one uniform redness, but is irregularly shaded with rose, brown, and white tints, and at times with violet: these different tints, which give it a marbled aspect, are owing to portions of parenchyma remaining sound, mingled with blood, as well as to altered layers of cellular tissue. Cells are also to be perceived within the parenchyma which are occupied by the lobules of the lungs, which themselves appear converted into homogeneous amaranthine-coloured substances. Here and there, divided bronchial tubes, and large branches of veins and arteries, appear."—"The impermeability of the lung prevents us from hearing the respiratory murmur, by causing a dulness of sound on percussion opposite the diseased parts, and this may happen at one single spot or in many places. A humid crepitous râle is heard around these places when they are in a state of inflammation. The respiratory murmur becomes louder in the sound parts than it was before; or in one entire lung, should the other be attacked by inflammation. The respiration becomes irregular and catching; the pulse tense, small and wiry; the cough dry, though sometimes humid; the skin harsh. The horse does not lie down, or but for a short time, and upon the affected side."

Should the symptoms continue beyond the sixth or seventh day without any decided change either for better or worse, we may consider the inflammation to have assumed the sub-acute or chronic form, and the duration and termination of the case to have now become extremely uncertain.

DIAGNOSIS.—Pneumony, in its true or inflammatory form, is very apt to be complicated with bronchitis and with pleurisy, though the former may exist without the parenchyma being affected; and, though very rarely, so may, I believe, the latter. Bronchitis is characterized by the short, catching, painful breathing; by the frequent presence or precedence of sore throat and catarrhal symptoms, and concomitant irritation and soreness of the air-passages; and pneumony is known to be absent by the sound condition of the lungs, as indicated by the respiratory murmur being everywhere audible. Moreover, in bronchitis, with the return of the secretion of the bronchia comes the mucous râle, and occasionally the sibilous râle. On the other hand, the characteristics of pneumony are, absence of any symptom or direct manifestation of pain: the horse is spiritless, listless, sad; stands in one place and posture with his head dependent, and notices nothing; hardly con-

descending to raise it, though offered a handful of hay or corn, or perhaps taking a mouthful, and retaining it between his teeth without offering to masticate it, as if he had forgotten he had accepted of it. Another marked symptom is, the death-like coldness and stiffness of the legs, and the difficulty there is in restoring warmth to them, and the still greater difficulty in retaining that warmth.

TREATMENT.—I will take it for granted that pneumony, either in its congestive or inflammatory form, has set in; which being the case, it becomes the imperative duty of the practitioner, without any regard whatever as to the state of the pulse or the condition of his patient, to abstract blood the moment he is called in. Generally speaking, a large orifice in the jugular vein is to be preferred to a small one: in cases of imminent danger it is absolutely indispensable. The quantity of blood to be abstracted must be as great as the patient will bear; and our sure guide in this, is the effect which the efflux of blood has upon the pulse at the jaw: while the blood is flowing, keep your fingers applied upon the submaxillary artery; so long as you feel that pulsating, so long may the stream of blood be continued; but the instant the vessel collapses under the pressure of the fingers, and pulsation is no more perceptible, let the blood-can be removed, and the vein pinned up. Should our patient not have begun already to grow infirm upon his limbs, he will invariably quickly become so after this signal; and, should the blood-letting be still persisted in, stagger and fall from faintness: an extremity to which it is never advisable to carry the abstraction of blood in quadrupeds. The quantity of blood we shall be able to draw on this first occasion will vary in different subjects and under modified circumstances: it may amount to a couple of gallons; it may not exceed a couple of quarts. Horses in hard-working condition in general bear blood-letting best; those pampered and fat, and but little worked, worst. A second blood-letting is often borne better than a first: when the quantity taken in the first instance has been but small and inadequate, if we will only wait a few hours until re-action appears to have taken place, we shall commonly be able fully to accomplish our object. Six, twelve, or twenty-four hours after the first full blood-letting, guided by the

exigence of the case, principally by the state of the breathing and pulse, it may become necessary to repeat the bleeding, regulating the quantity, as before, by the perception of the pulse at the jaw. I have found it requisite to bleed thrice during the first eighteen hours. I often find bleeding called for at intervals of twelve hours; in other cases, of twenty-four hours. This is what the French call blood-letting "*coup sur coup*." There seems often to be a sort of exacerbation of the disorder at these periods. Should the case proceed beyond the third or fourth bleeding, less quantities of blood will be required to produce the desired effect, and the intervals for repetition will become longer.

MEDICINE.—Some veterinary surgeons administer early in this disease, after they have bled, a stimulant; and though such measures as bleeding and stimulation would at first view appear irreconcilable, yet am I disposed to think, supposing the disease to be in the *congestive* stage, that the practice is a good one. After blood-letting has relieved the overcharged pulmonary vessels, a stimulant may prove serviceable, by adding to their power of contraction. The stimulant commonly exhibited, and perhaps the best, is nitrous æther. From one to two ounces may be given in a pint of warm beer or water. Should inflammation have begun, however, stimulants become no longer admissible. The medicine I have for many years been in the habit of exhibiting, and which, I believe, I was the first to introduce for pulmonary disorders, is the root of white hellebore; and although I have at times relinquished it for others—for aloes, for digitalis, for antimony—yet have I gone back with renewed confidence to it again. Could I be assured that no bronchial irritation whatever was present, or was likely to ensue, that the disease was confined exclusively to the parenchyma, I should not object to such a dose of purging mass being given—say half an ounce—as would render the contents of the bowels soluble; but, such is the morbid sympathy existing between the mucous membranes of the lungs and bowels, that, when one is disordered, I have too often had cause for pain and regret that I had administered any such stimulant as aloes to the other; and, after all, this is only in accordance with the old aphorism, "*purge a horse with inflammation of the lungs, and you will kill him.*" It

is on this account that I prefer—with a view to unload the bowels and keep them moving, which I still hold to be desirable practice—the occasional administration of clysters; not as performed with the bladder or simple injecting syringe, but as capable of being executed with Reid's enema-apparatus, which is as preferable to the other means as a dose of aloes is to a dose of linseed meal. After letting blood, then, I commonly order a clyster, supposing the bowels to require unloading; and this is all I do in the first instance. I do not hold it to be of much service to exhibit medicine internally until some impression has been made by bleeding: then, I commence with half-drachm doses of hellebore, repeated morning and evening, until such time as evident nauseant effect shall have been produced*. My formula is, of the root of white hellebore, finely powdered, ʒss—oatmeal or linseed meal, ʒss—honey or treacle sufficient for a ball. Hurtrel D'Arboval recommends opium, after having subdued the violence of the attack by "coup sur coup" blood-lettings; and "coma, oppression, and cough, are all that remain."

COUNTER-IRRITATION is a valuable aid in the cure of pneumonia; but it is one from which we are not to expect any operation, so long as the inflammatory action continues unabated: an impression must be made on the fever in the system, by blood-letting, before any blister, or rowel, or seton, will or can act. The best form of counter-irritation is *blister*: rowels and setons are of little or no use in acute pneumonia; and the preferable situation for the blister is the breast; for it will take effect on that muscular part when no impression can be made upon the tense skin and bony substance of the sides. Should the first blister take no effect, another may be applied at an interval of six hours, and repeated after a similar elapse, should the parts still prove obdurate; or, the part may be first scalded with hot water, and then the blister be applied. Or, a mustard embrocation may be used instead of the blister. The practice of keeping blisters open or discharging, is not one that answers with horses: it is better to

* For an account of the effects of hellebore, consult my first volume of Hippo-pathology, at page 117.

wash off the blister as soon as it has ceased to work, and after a short interval, should it be required; to apply a fresh one.

· STIMULATING THE LEGS is a practice I am not in the habit of pursuing myself: I prefer, when it can be done effectually, hand-rubbing them. For I fancy that the turpentine, which most of these leg-stimulants contain, is apt to engender irritation in the system, and, although it certainly warms the legs, to prove a source of annoyance to the patient. Still, it is my duty to add, that very excellent practitioners make it a rule to stimulate the legs whenever they remain cold; and a favourite application of theirs for the purpose is the turpentine liniment of the "London Pharmacopœia."

REGIMEN.—Whether we hand-rub or stimulate the legs, they, all four, should, from the onset of the disorder, be encased in long rolls of flannel or serge. At the same time clothes must be put upon our patient, sufficient to keep his body warm without proving burthensome to him, or, should it be in summer, without overheating him. It is also a good practice, immediately after blood-letting, to put on some additional clothes; since it so frequently happens that a copious sweat follows the evacuation, the encouragement of which I often have thought has proved very beneficial to my patient. No habitation is equal to a "loose box" for him; and one facing the south or south-west is to be preferred to another having a contrary aspect. A dry and ample straw bed should cover its floor, and a pailful of cold spring water be hung up in one corner of it. Last, but not least, let the patient's shoes be taken off: his feet being freed from restraint, doubtless will be rendered more comfortable. As to food, none at this time will be taken; and even if it would, is it proper that any for the first few hours should be offered.

SUB-ACUTE PNEUMONY.

The epithets, *sub-acute* and *chronic*, are here used to denote subdued or milder forms of pulmonary disease, sequelæ in general to the acute; though cases do occur, which from the first assume

these mild forms. With the exception of such attacks of acute pneumony as by bold and early treatment are at once arrested and supplanted by the return of health, and of such as rapidly continue their destructive course in spite of every measure we may employ to counteract them, all cases may be said to decline into the sub-acute stage prior to their termination, whether that be in the return of health, perfect or imperfect, in pulmonary consumption, or in death: here the sub-acute is to be regarded but as a mitigated form of acute pneumony. The rage of the inflammation is passed; the horse is no longer in imminent danger; he appears and is better; his breathing is less oppressed; his pulse is less quick and more distinct; the body and extreme parts have, perhaps, become warm, or they may remain cold; appetite has in some measure returned: still the patient mopes about his box, and is frequently found standing with his head towards one corner of it, instead of being in his manger; still neither his blisters nor rowels act kindly; and there is that expression of countenance and general aspect of him altogether, which impresses us with the firm belief that his malady is far from being removed, and that, without—and unfortunately but too often with—very narrow watching on our part, even now, we shall lose him.

PATHOLOGY.—The subdued or sub-acute inflammation now besetting the lungs is, we learn from experience, of that kind which tends to alter structure, and lay the foundation for morbid growths such as are never afterwards removed. Now and then pulmonary consumption dates its offset from this stage of pneumony. More frequently the alterations in structure are limited to a more firm and complete hepatization, to obliteration of air-cells and bronchial tubes, and to a conversion of the red hepatization into what is called *the grey and white indurations*, of which Delafond has presented us with the following description:—

THE GREY INDURATION seems oftener to *succeed* to the *red induration* or hepatization, than to be simultaneously present with it. The parts so affected assume a yellowish or greyish tint; they have acquired weight and consistence; their granules are smaller and closer together; their parenchyma is easily lacerated; sometimes compression converts it into a sort of jelly, from which may be drawn out cellular filaments, thickened and indurated:

incisions through these masses often discover either a black blood, or a semi-fluid, inodorous, greyish or reddish matter.

THE WHITE INDURATION is the result of still more advanced disease. In this, granules are no longer perceptible; the indurated parts are exceeding dense, and altogether impermeable to air; when compressed between the fingers nothing is squeezed out but a little serosity, without their suffering much diminution. At first view, we are puzzled to explain this disorganization: we, however, by means of analogous facts, shewing its progress from growth to development,—although the observations have not been made on horses—are enabled to arrive at some explanation.

The primary seat of these alterations would appear to be the inter-lobular cellular tissue; but, whether from inflammation of that same tissue, or from the effects of inflammation in the parenchyma of the lung or in the pleura, is still matter of dispute between Dupuy and Delafond. Infiltration into this cellular tissue, at first of a serous, afterwards of a plastic nature, is evidently the forerunner of the change: the reabsorption of the affected fluid, as observed by Delafond, being slower within the cellular tissue than within the parenchyma, it follows that the fluid, become organically allied with the cellular membrane, may continue long after the cessation of the inflammation of the parenchyma, and form plastic layers and kinds of partitions inclosing the pulmonary lobules. I have observed, adds he, these layers grown thick and indurated, surrounding anormal productions developed in the very heart of the lung—tubercles for example—to resist the disorganization of these morbid tissues, and remain the walls of cavities containing the mollified matter. Sometimes, in the same situations, we meet with disorganized masses of lung resulting from partial gangrene. For these layers or partitions, while they continue to increase their dimensions, so compress the pulmonary tissue, that they atrophize it, render it light-coloured, dense, and impermeable to air. According to Delafond, therefore, the white and grey indurations would be approaches to pulmonary atrophy: we, however, think that this holds true in regard only to the grey induration, and that in the white induration, properly so called, the parenchyma of the lung has completely disappeared, through absorption, and nothing remains save the cellular tissue indurated. Let us not forget to add that the white induration is not constantly met with around tubercles; on the contrary, under many circumstances, the pulmonary tissue surrounding these crude heterologous masses presents simply a reddish areola.

Be these explications as they may—and, after all, they possess no real interest save as part of physiological pathology—Delafond considers the presence of grey induration to be indicated by the long standing of the disease, the entire absence of respiratory murmur, without crepitous râle; by deadness of sound, dry cough, emaciation, evanescent hot skin, and harshness and adherence of it

to the subjacent parts. The extremities of the lobes of the lungs are often thus affected.

METASTASIS.—Every now and then it happens, after inflammation in the chest has continued for some time, and such a change in the symptoms has taken place as to give us hopes that our patient will recover, that, on the next visit we pay, we find him with his legs drawn together under his body, "all of a heap," and unable to move. Too well does the experienced practitioner instantly recognise the cause of all this : he has succeeded in rebutting one enemy ; he has now even a more formidable one still to contend with—viz., *fever in the feet*. To make use of the common expression on this occasion, "the fever or inflammation has fallen from the lungs into the feet." Another part into which the inflammation may "fall," even after the patient has been pronounced perfectly convalescent, is the fore fetlock-joints or flexor tendons and ligaments. I made mention of this in a case I sent to *THE VETERINARIAN* in 1829 ; and the following year I had the satisfaction of seeing that the same had attracted the especial notice of my lamented friend, Mr. Castley, of the 12th Lancers. The attack is often so like a common "sprain of the back sinews," that in any other case it would be pronounced to be such ; and the horse may limp quite as much, or even more. In some cases only one leg will experience this ; but it more commonly happens, I think, that after an interval of some days—in one case it was seventeen days—the other fetlock becomes attacked. The swelling at first feels puffy, as though its contents were fluid ; is exceeding tender to pressure, and is often situated to one side of the flexor tendons in the leg, from which in two or three days it drops down to the fetlock-joint, gradually losing its puffiness as well as its tenderness. Regarding it as a sort of rheumatic metastasis, I have fomented and used cold lotions and bandages for it, and, on some occasions, have practised local bloodletting—from the plate-vein—for it, and at the same time have exhibited gentle aperient medicine : I am not quite sure, however, that I have done any good by all this*. In one instance it ended in ankylosis.

* A case has lately occurred to me in which during convalescence both *hocks* became swollen, tender on pressure, and warm to the hand, causing the horse to have a stiff straddling gait in his hind parts, and evidently arising from a translation or fresh attack of inflammatory action upon ligamentous structures.

IN THE TREATMENT OF SUB-ACUTE PNEUMONY, although we may have got rid of the acute or dangerous symptoms, although the disease may have assumed this comparatively mild form from the beginning, yet are we not to imagine that in this mitigated stage it is harmless; so far from it, this is the form of all others in which inflammation, by continuance, brings about those alterations of structure—hepatization, induration, tuberculation—which are so much to be apprehended, not only from their tendency to destroy life, but also, supposing they do not do this, from their rendering the lungs more or less impermeable to air, and consequently so much the less perfect for the purposes of respiration, leaving the horse short or thick-winded, unthrifty, consumptive, valueless. The presence or continuance of inflammatory action is to be met at every point, not with the same boldness of practice, but with the same unremitting perseverance, until we are satisfied that what inflammatory or febrile action remains is but the decline of that which, from all appearances, is taking the turn to end in the restoration of health. Venesection must be persisted in. As to quantity, the pulse is still our best director: only let it be understood, that—unless the case should be primary, and the bloodletting should be a first or second one—there is no occasion to carry it to the extent recommended in the acute stage of pneumonia: on the contrary, I mostly find that small evacuations of blood—such as from four to six pints—repeated as often as the pulse regains its strength and quickness, and will bear them without sinking away under the fingers, prove the best counteractives.

HELLEBORE is still the medicine most to be depended on. It may now be combined with small doses of calomel and with diuretic medicine. The following ball may be given once or twice a-day, but not oftener:—

Take of Powdered root of white hellebore..... ℞j
 Calomel.....gr. xv
 Resin and soft soap sufficient to make a ball.

BLISTERS AND ROWELS AND SETONS are especially useful in this form of the disorder. I would put a sharp and large blister upon the breast; or a rowel may be inserted first, and a blister rubbed afterwards upon it. At this time also the sides may be

blistered, or setons may be introduced into them. In my own practice I depend most on blisters upon the breast, with, now and then, the insertion of a rowel.

CHRONIC PNEUMONY.

THIS is a kind of disease in which, although inflammation may be, and commonly is, demonstrably present, yet it is in that subdued or mild form which plainly foretels that the case will prove one of considerable duration. There is no occasion for any immediate alarm about the life of the patient; and yet, since the lungs have become the seat of disease, though it be of a tardy and lingering nature, it may be difficult or impossible to say what may be the result. Chronic pneumonia may prove the continuation of that which in the beginning was acute, and afterwards became sub-acute; or it may, and often does, have its own origin, run its own course, and terminate in its own peculiar modes, as though it were a disease *sui generis*.

THE SYMPTOMS are often of that mild and indefinite character as to require on our part a great deal of search and inquiry into the case to find them out. The horse is evidently unwell, and yet, to common observation, no particular ailment is demonstrable. There may be no perceptible heaving of the flanks; but little quickness of pulse; no manifestation of pain; and yet the horse mopes about, dull and dejected; fastidious in his appetite; seldom or never lying down; looking unkind in his coat; and out of health altogether in his general appearance. Watch his nostrils: in some of these cases I have found disturbed respiration to be detectible in their movements when I could gain no information from the flanks. At the beginning we must inquire about cough, and examine the nostrils narrowly, to ascertain if there be any flux from them.

DIAGNOSIS.—Such symptoms as these will be sufficient to direct our attention to the chest as the seat of disease: now that we have percussion and auscultation, however, we need not stop inquiry here, but avail ourselves of their valuable aid to confirm our diagnosis, and afford us further information as to the particular seat and nature of the morbid action and alterations going on.

TERMINATIONS.—Chronic, the same as sub-acute inflammation, is to be viewed as a disorganizing or destructive process, though it be of a slow and tedious nature ; it may end in hepatization or induration of the substance of the lungs : it is very apt, indeed, to run on to produce tubercles and vomicæ, and in this form bring the case under the denomination of what is commonly called *phthisis*, or “pulmonary consumption.”

THE TREATMENT to be pursued in these obscure, latent, insidious chronic forms of pneumony, is to be substantially the same as that recommended for the sub-acute stage : such points as there may be of difference will best come under consideration in treating our next subject, viz.

PHTHISIS.

By *phthisis*—a Greek word, whose literal signification is *corruption* or *extenuation*—is intended to be expressed the manifestation of certain constitutional changes, among the most remarkable of which is *emaciation of body*, consequent on the formation of tubercles and vomicæ within the substance of the lungs. It is a form of disease to which the horse is not obnoxious in an equal degree with man, inflammation in the animal's lung commonly assuming the acute character, and speedily ending either in destruction of life or in convalescence ; whereas tubercles are for the most part the offspring of a tardy, latent, lingering form of inflammatory action, such as we have described under the epithet of “chronic.” According to D'Arboval, horses and oxen afford more frequent examples of *phthisis* than sheep and dogs. And there are, he says, certain periods of life, in animals as well as in men, when the disease is more likely to make its appearance ; which are, the several ages at which they arrive at the fourth, the third, and the half of the terms of their natural lives. *Phthisis* may be the sequel of pneumony or pleuropneumony, or even of some neglected catarrhal or bronchial affection ; at other times it will come on of itself—as a disease *sui generis*—and insidiously steal on the constitution, making alarming advances before we become, perhaps, apprised of its existence : old horses being the most frequent subjects of the former ; young ones

of the latter mode of attack. A young horse will undergo acute pneumonia or pleuro-pneumony ; and should he not sink in the congestive stage, or have his disease cut short by treatment, will die during the second or third or fourth week, with his chest full of water and intersected with albuminous effusions, and his lungs condensed and hepatized : but an old horse, with stamina to endure the conflict between disease and remedy, will hold out while tubercles and vomicæ are generating in his lungs, and, in the end, die of phthisis.

HEREDITARINESS AND PREDISPOSITION.—Is the *disease itself* hereditary ?—or only the *predisposition to it* ? Do tubercles, or the seeds or rudiments of tubercles, actually exist in the lungs at the time of birth ? We seem to lack proof of this being the case ; whereas we have had demonstration enough of horses “breeding the disease” in their constitutions. There are certain “makes” or forms of body, and there are also certain situations, in which the disease is most likely to be bred. The colt predisposed to phthisis is the one characterized by long legs and over-growth ; by narrow chest, and flat sides, and pot-belly ; and altogether by an appearance of weakness and unthrivingness : to which D’Arboval adds, by more spirit and eagerness than is compatible with his physical development. In such a constitution as inhabits a body so constructed, we know, by experience, that pneumonia is exceeding apt to end in phthisis. Whether the tubercles exist prior to any attack of inflammation, or whether they form in consequence thereof, I will not here venture an opinion. There are two situations observed to be favourable to the generation of phthisis, which are certainly in their nature very opposite : one is, low, wet, cold, poor pastures ; or other localities where the animals are almost constantly respiring humid air, standing in wet, exposed to cold, and withal are half-starved ; the other situation is, living in warm and foul stables, wherein the atmosphere is of that impure character that is known to be offensive to the membrane lining the air-passages. I have on many an occasion remarked, when my regiment has had a remount of young horses, and one of the lot—looking thin and rough in his coat, perhaps, when purchased—instead of improving in flesh and condition with the rest, continued in his unthriving state, that,

although perhaps for a length of time he manifested no illness, yet in the end he became phthisical. In this instance one would feel disposed to think that tubercles must have pre-existed in the lungs, and that the supervention of inflammatory action induced phthisis. On the other hand, it is notorious enough that many old horses in the cavalry—who have been turned out since their enlistment, and who, up to the period of their death, at an advanced age, have been known to enjoy the best of health—end their days either by consumption or by glanders; in both cases the lungs exhibiting tubercles and vomicæ. While the former fact, therefore, would lead us to regard tubercles as either an accompaniment or a formation, *sui generis*, in the young animal, the latter leaves us little reason to doubt that they become generated while inhabiting the stable.

THE SYMPTOMS OF PHTHISIS are numerous and liable to considerable variation. They may be conveniently considered under three stages:—

In the first stage—in the curable one, if it ever be cured—it is often extremely difficult to pronounce upon. A horse is shewn us for being out of condition, rough in his coat, hide-bound perhaps, and, for all the pains taken with him, having failed in improving his condition. Moreover, he is foggy or weak at his work, sweats but with slight exertion; he is heard to cough occasionally after his water, or when first brought out of the stable, and is found short-winded. This suspicious state of body may have originated spontaneously and imperceptibly—may appear as if it had been bred in the animal's constitution, grown with his growth and increased with his strength; or it may prove the lurking sequel of some pectoral inflammation going before and, perhaps, passed off; or it may, *longo intervallo*, follow strangles. The state itself is of most uncertain duration; it may last weeks or months: it has been known in young animals to continue years.

During the second stage the case more or less develops itself. The respiration, though it may not be perceptibly disturbed at the flanks, may probably be found to be slightly disordered by narrowly observing the nostrils; and if they do not afford us the required information, our ear, applied to the breast or side, may. By this, or with our hand, we may also discover tenderness about the sides.

The pulse will be found quicker than it ought to be. A short dry cough is heard now and then. The appetite is fastidious : at one time pretty good ; at another, indifferent ; never quite lost however. The spirits, like the appetite, vary : one day, unaffected ; another day, depressed. Some sparing issue of yellow matter may be observed from his nose. He but seldom or not at all lies down. He loses flesh every day ; his hip-bones begin to project, and his quarters to lose their plumpness ; and his skin has become tense and adherent upon his ribs.

The third stage not only dispels all doubt—should any remain—concerning the nature of the case, but too plainly discovers to the practitioner that he is treating a disease under which, in spite of all he can do, his patient must in the end succumb. It is marked by increased embarrassment in the respiration ; by fœtid breath ; by discharges from the nose, either purulent or of a white grumous or granulous nature ; by a highly quickened pulse ; by more troublesome cough, and the occasional coughing-up of the expectorated matters through the nose and mouth ; by great emaciation and debility ; by partial separation of the coat, so that when but slightly twitched the hair comes off ; by dropsical swellings perhaps of the legs, sheath, and belly ; by complete loss of appetite ; by general irritability, and a truly distressing, cadaverous sort of expression of countenance ; by an irritable state of the bowels and great proneness to diarrhœa, which, once excited, in this state of extreme debility, is very likely to carry our patient off.

THE POST-MORTEM APPEARANCES, as well as the symptoms, are liable to a great deal of variation. In some cases, according to D'Arboval, the "lungs are found *perished* as it were—shrunk and dry and hard and tough, and particularly towards their borders ; in others they assume a dull, tarnished, reddish-brown aspect, and are hepatized." These, however, ought not to be considered as examples of phthisis : "the development of *tubercle* in the lung," says Laennec, "is, I think, the only kind of phthisis which we should admit ;" and if we would avoid confusion of names and of pathological differences, we cannot do better than subscribe to this restriction.

THE DEVELOPMENT OF TUBERCLES in the lungs or other organs, occurs, ac-

cording to Bayle and Laennec, under two principal forms :—that of *insulated bodies* and *interstitial injection* or *infiltration*. “Each of these presents several varieties, chiefly relative to the different degrees of development. The insulated tubercles present four chief varieties, which I shall denominate *miliary*, *crude*, *granular*, and *encysted*. The interstitial injection of tuberculous matter, or tuberculous infiltration, offers in like manner three varieties, which I term *the irregular*, *the grey*, and *the yellow*. Whatever may be the form under which the tuberculous matter is developed, it presents, at first, the appearance of a grey semi-transparent substance, which gradually becomes yellow, opaque, and very dense. Afterwards it softens, and gradually acquires a fluidity nearly equal to that of pus : it being then expelled through the bronchia, cavities are left, vulgarly known by the name of *ulcers of the lungs*, but which I shall designate *tuberculous excavations*.”—LAENNEC’S TREATISE.

BOTH OF THESE FORMS OF TUBERCLES are found in the lungs of horses. The miliary tubercles—which in their progress, by coalescence and conversion into one yellowish homogeneous mass, afterwards become the crude tubercle—are the kind commonly discovered in horses who die of phthisis ; round or ovoid in figure, solid, firm, and uniform in substance, or exhibiting in their centres yellow or white spots, or else softened altogether in their consistence, according to the progress they may have made towards maturation. Now and then it happens, from coalescence and simultaneous supuration of masses of these tubercles, that large abscesses form within the lungs, and discharge their contents into some of the bronchial tubes, leaving cavities or caverns with irregular or anfractuous interiors, which Laennec has designated *tuberculous excavations*. More commonly, however, the tubercles suppurate individually, producing what are called *vomicæ*, that is, small abscesses in various parts of the lung. The other kind, the large yellow, or cream-coloured, or speckled, cheesy tubercle, that of Laennec’s, resulting from infiltration, is also very often found in horses’ lungs, and after pneumony oftener than after phthisis ; a circumstance that induces us to regard it as one of the remote consequences of inflammation : indeed, it appears ordinarily to supervene upon the morbid states of hepatization and induration ; whereas in the case of miliary tubercles we are as often at a loss to account for their production as we are to ascertain their presence, it being well known that they may exist in a sort of dormant state in the lungs for years, without occasioning any disorder or apparent inconvenience

to the animal. This need not excite surprise after perusing the following case :—

Mr. Hales, V.S., of Oswestry, was some years ago attending a cart-mare for a festered foot, and found it necessary to administer a second—she having already taken one—dose of physic. The day after this last dose, she died. She had not been dead above two hours when Mr. H., paying his usual visit, astonished at the event, was told in addition, and not very good-humouredly, that *his physic had killed her*. He inquired if it had purged her? The reply was, “No; it had not operated at all.” Mr. H. then very properly proceeded to examine the mare. “Her chest being opened, the mystery was unravelled. It was deluged with pus; and there were then in the lungs several large abscesses, one of which contained at least *a quart of pus*. The case was plain enough—a large abscess within the lungs had burst, and suffocated the mare.” “The gentleman to whom she belonged declared he always believed the mare to be as sound as any horse he had in his possession. She ate her food to the last, and lay down very much to ease her painful foot.”—VETERINARIAN, vol. v, p. 264.

THE DETECTION OF TUBERCLES, while they are small and hard and unirritating, is what even percussion and auscultation fail in accomplishing: their existence can only be made out by these tests, and then but imperfectly, when they are numerous and large, and occupy a considerable portion of lung. The diminished murmur of that part, and its want of resonance on percussion, may induce us to suspect what is the case. Tubercles are most commonly found in the anterior and superior portions of the lungs. Suppuration and tubercular excavation will be announced by the cavernous râle prevailing.

TREATMENT.—Pulmonary consumption, once established, is a disease without remedy; at least, we know of nothing that has the power to rectify or remove those morbid changes of structure on which its confirmed existence depends. In colts already predisposed from their make to consumption, or in such as have contracted the predisposition from the situations they have inhabited or the vicissitudes they have been exposed to, and who, perhaps, have the seeds of consumption already sown in their lungs, we unquestionably possess some power of prevention, by attending to them in a manner and with a care which their peculiar case may appear to demand. We may go still farther than this, and say, that when inflammation or febrile action has to do with the setting-in of the

disorder, we have the power of suspension, if not of arrest, in our hands. As I have had occasion to observe before, inflammation ought never to be suffered to lurk or creep about the chest of a horse: it is a part so apt to take fire and burn with a smothered heat, that it requires, in every case to which suspicion of the sort attaches, the utmost and narrowest vigilance on the part of the practitioner. Let him who has a young horse out of health look to his chest: other parts will announce their ailments plainly enough.

PREVENTIVE TREATMENT consists in not only avoiding every bodily exertion and mode of living or habitation that may, by any possibility, be likely to give rise to inflammation in a chest ill-adapted to bear it, but in removing the animal from any situation in which he appears unhealthy into one of another description. During spring and summer, a run at grass often proves of the greatest benefit in giving a healthy turn to an ill-conditioned consumptive-looking colt: in cold and wet weather, on the contrary, the removal of such a colt into a loose stable, and there keeping him regularly, but moderately, fed and exercised, and well supplied with water, clothing, and cool air, would be most advisable. As to

MEDICAL TREATMENT, I know none that is or can be of service save what tends to check or subdue inflammation in the chest; nor can we expect much good from that but in such cases as are in their formative or incipient stages. We must narrowly watch the progress of catarrh and cough and strangles and bronchial affections in subjects such as I have described; and where there appears the slightest reason to believe that inflammation, in however mild or latent a form, has entered the chest, we must without hesitation attack it by bleeding, by sedative medicine, and by counter-irritation. Even though the subject be a weedy and to appearances a weakly one, still in a case of this sort we must bleed, and in general bleed several times, taking, however, only very small quantities of blood away; one or two quarts being probably as much as each successive time can be borne. Next, set the bowels in order by enemæ, or some very mild aperient or alterative medicine; then give scruple doses of hellebore. As soon as we have succeeded in subduing the febrile action, we may give, twice a-day,

Digitalis.....	gr. x
Calomel.....	gr. v
Nitre (powdered).....	ʒiiss
Soft soap sufficient to form a ball.	

I prescribe in this manner, supposing the subject to be young and ill-conditioned and constitutionally weakly, and under the supposition that the inflammation is of that insidious lingering kind which we call *chronic*, but for which a better name, perhaps, is *latent*. Lastly, insert a rowel in the breast; and if more is thought necessary, blister the part also. As soon as the animal becomes convalescent—but not before we are quite assured that all inflammatory action has quitted his chest—should the season permit, give him a run at grass; if not, soil him in the stable. Indeed, that may beneficially be done while we are treating his disorder, by giving green-meat when it can be got; otherwise, carrots, turnips, potatoes, &c.

PLEURISY.

BY *pleuritis*, or pleurisy, is commonly understood inflammation of the pleura without inflammation of the lung: when both pleura and lung are involved in the inflammation, we denominate the case *pleuro-pneumonia*, or pleuro-pneumony. At the time that I was a pupil at the Veterinary College these three disorders, or forms of disease, were included under the phrase “inflammation of the lungs:” the lungs were supposed in all such cases to be the seat of disease; whether the pleura participated or not in the inflammation was never inquired into until after death. The French veterinarians were the first to call our attention to the distinctness of these diseases, and to instruct us how in practice we were to know one from the other; and in our own country no veterinarian took more pains to learn and demonstrate this difference than my poor ever-to-be-lamented friend, Mr. John Field*. Whether, in strict accordance with pathological definition, inflammation is ever fully developed in the pleura without extending to the lung, or

* Mr. Field read a paper on the subject to the Veterinary Society, which was afterwards published in the second vol. of *THE VETERINARIAN*.

vice versâ, is not a question I shall trouble myself to solve : all that it is necessary for us to know, in my opinion, is the fact, that, when inflammation is invading these parts, it is sufficiently predominant in one to induce us to regard that as the *chief* or *principal* seat of disease, and to treat the case in accordance with such views ; and that it is, comparatively, rarely so equal in its attack of the two parts, as to lead us to believe that one is quite as much the object of care as the other. There are cases enough of pleuropneumony, perhaps more than of any other description : still I contend that in almost all of them we shall find either the lungs or the pleura to be the part primarily and principally affected ; and as such, as I before observed, to be the especial object of treatment.

"Is pleurisy really a less frequent disease than pneumony ? as Delafond affirms," asks D'Arboval : "we dare not assert so much. What renders it so much to be dreaded, is the fact of its so often spreading to the lungs, when, indeed, there is too much chance of its proving mortal ; at least, cases of complete recovery are then very few indeed."

SUPPURATION.—The pleura will now and then pour forth pus under inflammation. The matter is commonly seen in flakey masses adhering to the surface of the membrane, or else floating about in the effused water. Cases have occurred in which it has collected and formed an abscess in the side of the thorax.

GANGRENE, though very rarely, is now and then occurring as a termination of pleurisy. The cases I have met with have been remarkable for intensity of inflammation and severity of suffering. I will relate one case.

In 1830, a four-year-old horse was discovered at seven o'clock in the morning, in his stable, sweating profusely : heaving hard and quick at the flanks, and puffing at an equal rate at the nostrils ; pulse but very indistinctly to be felt ; mouth hot and clammy ; legs intensely cold ; head hung down, and countenance betraying serious malady ; eyes and nose reddened, and the latter moist with yellowish sanious matter ; breath fœtid as well as mouth. When pressed upon the side, he flinched and turned his head, and evinced much soreness.

As soon as he was got dry and warm from the cold sweat he was in, he was bled : scarcely, however, had two quarts of dark thick blood flowed before he began to reel. The treatment afterwards was such as is ordinarily pursued ; but to no purpose. The pain he manifested was extreme. He would rub his

nose against the rail across the door-way of the box, thrusting his lips violently against it, and sink his eyes with suffering. He was twice seen to lie down, but immediately rose again. Towards the conclusion, a bloody issue appeared at the nose. Before death he became delirious, and expired in dreadful agony. Water within both sides of the chest—from six to eight quarts. Pleura intensely inflamed: costal portion every where most minutely and thickly injected; pulmonary portion likewise injected, but it had also become gangrenous—it exhibited a *green hue*. Lungs partially tuberculated; otherwise, and particularly in their interior, they were sound.

THE KINDS or forms of pleurisy are two—acute and chronic: one may follow the other; or the chronic kind, as well as the acute, may exist by itself. Although consisting, as far as we know, both in inflammation, they appear quite opposite diseases: one is full of activity and expressions of pain and irritation; the other is comparatively painless, tardy in its progress, and apt to continue many weeks before it will come to any issue.

THE MOST LIKELY SUBJECTS for pleurisy are horses four and five years old, about completing their growth, and entering into the adult period of their lives, and inhabiting warm stables, and living high.

CAUSES.—Any sudden or extra exertion, any exposure to cold, immersion in cold water of the legs or body while the skin is heated, or even a large draught of cold water at such a time, may be followed by an attack of pleurisy. Injury to the membrane, such as a broken rib, or a severe blow or fall upon the side, might be productive of a pleurisy; but the occurrence is rather unlikely to happen. By chemical stimulating matters introduced into the cavity of the chest, pleurisy has been artificially excited.

THE ATTACK OF ACUTE PLEURISY may be sudden; or there may be some previous indisposition, in which incipient form it may be confounded with pneumony or bronchitis; but as soon as the inflammation has fairly set in,

THE SYMPTOMS will prove such as will dispel any doubts we may entertain of its presence. The horse will begin by evincing uneasiness, and that will increase until he comes to manifest acute and poignant pain. And now he will heave, or rather pant, violently at his flanks, puffing and blowing in the same painful and distressing manner from his dilated nostrils, and occasionally cast-

ing most piteous looks back at his flank, as if entreating the bystander to relieve him of the agony he is enduring. He is hot all over his body—actually in parts sweating with pain; is in a state of nervous irritation, and he cannot be easy a minute, but is looking first one way, then the other, and every now and then pawing with his fore feet, or else lying down for a moment, to try if that posture will give him ease; but finding none, he is up again almost as soon as down. Pressure against the intercostal spaces occasions flinching and shrinking, and offers to bite. Often a cough is present, and this so annoys him by the pain it occasions, that he, in efforts to suppress it, makes a sort of reiterated hacking or half-cough of it. The pulse is very quick, and has a firm wiry feel. The mouth is hot and dry. The pituitary membrane is reddened and humid; but there is no perceptible defluxion, unless some catarrhal or bronchitic irritation is present.

AUSCULTATION detects the respiratory murmur, though not so distinctly as in health; while *percussion*, which evinces the characteristic soreness of the sides, yields distinct resonance.

THE PROGRESS of pleurisy is rapid. Should no change take place within twenty-four hours after the disease appears at its height, we may rest assured another day cannot pass without the issue of the case becoming manifest, either in subsidence of the symptoms, or in such abatement of them as to render it but too evident that—what we have most to dread, namely—effusion, is going on.

THE RETURN OF HEALTH is often as rapid and unexpected as the attack was sudden and unlooked for. We are called to our patient, distressed to the last degree by his complaint; we take a large quantity of blood from him, and in a very few hours afterwards we find him quite recovered.

THE DIAGNOSTIC or distinguishing characters of pleurisy, are—1st, The general manifestation of acute, poignant pain. (Dr. Elliotson represents the pain in a pleuritic man to be “acute and stabbing.”) 2dly, The particular or local manifestation of pain in one or both sides, when firmly pressed against. 3dly, The respiration, which is short, catching, painful, and puffy. 4thly, The breath not feeling hot to the face or hand presented to the nostrils of the patient. 5thly, The pulse, whose beat is quick, firm and

wiry. 6thly, The cough, so frequent an attendant, which is hacking, reiterated, cut in two, as it were. 7thly, The symptoms of colic, which are often present. 8thly, and particularly in the advanced stages of the disease, percussion and auscultation. Notwithstanding these tests, however, cases of pleurisy in a sub-acute form occur, in which the diagnosis in the primary stage is often very obscure.

OUR PROGNOSIS in pleurisy must be guarded, it being a disease of highly dangerous tendency. If, however, we are called early to the patient, and succeed in abstracting a large quantity of blood, we shall have a good chance of arresting the inflammation. Should it proceed in spite of blood-letting, though with diminished violence, there will still be great reason to dread some sinister result. Now and then, the disease hurries off the patient in the course of a few hours, in opposition to all remedial measures.

THE TERMINATIONS of pleurisy are four:—*resolution, effusion, suppuration, gangrene*. That in resolution has already been disposed of: we will now consider

EFFUSION.—It is of two kinds,—*water* and *lymph*: the one being technically known under the appellation of *hydrothorax*, or water in the chest; the other, by that of *albuminous effusion, adhesions, or false membranes*. Although these effusions may exist independently, they far more frequently co-exist. When a horse dies from a pleurisy which has lasted any length of time, we expect to—and commonly do—find that appearance in the chest which an old veterinary friend of mine was wont aptly to depict by saying, “the cavity of the chest was hung with shreds of lymph, after the fashion of a *cobweb*.” and the comparison is certainly a peculiarly happy one. These subjects will be continued under the headings—*Hydrothorax* and *Adhesion*.

PLEURISY RARELY CONFINED TO ONE SIDE.—We know this from practice; and experiment—as will be hereafter shewn—proves that it is from sympathy often that the other side takes the disease.

THE TREATMENT of pleurisy may be said to be comprised in the regimen and remedies which have been recommended to be adopted in pneumonia: there are some points of difference in the

application of that treatment, and to these we shall proceed to direct our attention.

BLOOD-LETTING, as in pneumony so in pleurisy, must be regarded as our most potent remedy. But here, for it to prove most effectual, it must be carried to the extremest point of depression, compatible with safety or power of standing: I do not consider that practice free from danger which draws blood to an extent of enfeebling the animal beyond his strength to maintain himself erect. The reason for this extra-depletion is to be found in the fact of membranous parts, on account of the smallness of their bloodvessels, being less under the influence of general blood-letting than large vascular structures; the same also forms a reason for the repetition of this exhausting blood-letting; as soon as the pulse shall be found to bear it, should the respiration and other symptoms of pain and irritation not abate. After an interval of from four to eight hours, a second blood-letting may be required; and after a like interval, a third: subsequently, we must be guided by the remaining strength of our patient, and by other circumstances. Although we are able in this manner to diminish the powers of the vascular system, yet do we not always succeed by it in accomplishing one most desirable object, which is the relief or unloading of the vessels in a state of inflammation: it is *local* blood-letting which—after the constitutional powers have been lowered—operates with most effect upon the capillaries, and hence one great advantage possessed by surgeons over ourselves in the treatment of pleurisy. They have leeches at hand to apply: we might shave the sides, and put on leeches too; but from the number we should require, and the cost incumbent, I fear the practice would not be found maintainable. There are also sufficient objections to any attempts at cupping the sides. By way of substitute for these objectionable or impracticable modes of drawing blood locally, D'Arboval speaks, with all the confidence of one who has frequently practised it, of the following method of obtaining blood from the chest:—"Let the inferior parts of the sides be shaven, and rubbed with hot vinegar until rubefaction is produced; then let hot mustard poultices be applied upon them, and kept on for two hours, or until such time as engorgement shall have taken

place, which is to be scarified, and thus as much blood obtained as may be required. After the bleeding, the sides are to be covered again with mustard poultices. This local blood-letting may be repeated as often as is deemed necessary—four or five times within the space of twenty-four hours. Fomenting or steaming the sides with hot water will greatly increase the emission of blood; and a hot cataplasm will be found to give much relief when the pain is confined to any one place.” How far this French mode of procedure may be effectual or advisable, from never having tried it myself, I cannot pretend to give an opinion. I think it, however, in desperate cases well worth a trial.

OTHER REMEDIAL MEASURES to be adopted must be the same as are recommended for the cure of pneumonia. After blood-letting I deem it highly advisable to administer an enema: it tends to empty the bowels, and in some degree relieve the nervous irritation present. Aloes must not be given: the lining membrane of the alimentary canal is in much too susceptible a condition to bear their drastic operation. Indeed, I would not give any medicine at all until some manifest abatement had been effected by blood-letting; and then I would give half-drachm doses of hellebore in the manner and under the limitations recommended*. Blisters upon the breast may likewise be used. And as to regimen, such is to be followed as has been already detailed.

EFFUSION.

SHOULD our patient survive the fury of the first attack, and the inflammation so far abate as to come under the denomination of *sub-acute*, our apprehensions, though allayed on the score of immediate dissolution, still continue while inflammatory action is going on, impressed as our minds are with the fact of there being but too much reason to dread that, after all, the case will end in effusion. This, as I stated before, is of two kinds,—*water* and *lymph*; and these, as I also observed, may exist either in combination or separately: most commonly they co-exist.

* In the treatment of pneumonia, at page 87.

THE WATER resulting from acute pleurisy is in most cases a beautifully clear, limpid, bright-yellow fluid, closely resembling the serum of the blood, though in some cases it is rendered turbid by the lymph floating in it; while in others it is red from being tinged with blood; and I have seen it of a sort of milky or whey colour, from the commixture of purulent matter (also discharged from the surface of the membrane) which will occasionally communicate a bad odour to it. In many cases in which lymph or fibrinous matters are found mingled with it, the fluid is of that albuminous character that, on being set by to cool, it will in a short time coagulate. Its quantity will vary in different cases from a few pints to several gallons. Commonly, some is found in both sides of the chest; now and then, however, it is effused but on one side. In general the fluid being unconfined, gravitates to those parts of the cavity which are lowermost, such being the sternal or the costal region of the thorax, according as the animal happens to be in a standing or a lying posture. I have, however, seen the fluid, or part of it, walled in by the effused lymph so completely that, like the pus within an abscess, it was confined to one place. We will prosecute this subject when we come to Hydrothorax.

THE LYMPH, when first effused, consists of masses of gelatinous or albuminous matter, impregnated with serous fluid, variously disposed; sometimes in bands or filaments athwart the cavity, from the lungs to the ribs, intersecting or partitioning the interval into several most irregular compartments, the whole, in its apparently deranged or fortuitous condition, resembling nothing so much as the hanging of a cobweb; at other times in sorts of granulated or filamentous tunics, clothing both surfaces of the lung, and forming an entire interior lining to the cavity, and in many cases coating the exterior of the pericardium as well, such layers or coatings being what we are to understand by the appellation, *false membranes*. In addition to which are often to be perceived masses and flocks or strings of lymph floating about in the water, or from their weight gravitating to the bottom of the cavity. I believe this fresh lymph may become re-absorbed. In general, however, it remains, and acquires increased consistence, and undergoes a gradual process towards organization. According to D'Arboval, "sorts of insulated

portions of blood first make their appearance here and there within it, in which are discoverable little straight or flexuous canals, also filled with blood, terminating in culs-de-sac, and having no communication with the vessels of the pleura; from which, indeed, they are separated by a layer of lymph. In a more advanced stage is to be observed cellulo-fibrous layers, more or less dense, intersected through their most consistent parts by a variable number of parallel, rectilinear, and extremely slender vessels. At length the time arrives for these vessels to unite with those of the pleura, and from that hour the false membrane constitutes a part of the integral structure."

IN WHAT SPACE OF TIME MAY, OR ORDINARILY DOES, EFFUSION TAKE PLACE?—This is a question of vast importance to the veterinarian. Disputes and horse-causes are so apt to arise out of horses dying of pleurisy or pleuro-pneumony, wherein we are liable to be called upon for opinions, which, if not received as decisive, must on all occasions be supposed to have considerable influence in the decision, that it becomes in us a bounden duty to make ourselves complete masters of the subject in all its various relations. We are requested to inspect the body of a dead horse—whom we may have seen during life, or may not—and we are summoned before a jury to give evidence on oath concerning the period of time such morbid alterations as may be presented to us would take in forming; or, in other words, to say from what antecedent date the commencement of the horse's disease is to be computed. This of all others is, perhaps, the situation the most trying, the most responsible, the most fearful, in which a veterinary surgeon can be placed.

Referring to my own practice and personal observation, I find, that, in one horse who died of a pleuritic attack in seventeen hours after he was seized, there were recent adhesions formed between the lungs and sides. In another case it appeared sufficiently evident that three gallons of water had become effused into the chest within three days. From numerous experiments, however, which have been made in elucidation of this subject by the French veterinarians, Dupuy, Delafond, and Hamont, we are enabled to speak with more confidence and certainty.

DUPUY injected into the right cavity of the chest, between the eleventh and twelfth ribs, two drachms of oxalic acid dissolved in three ounces of water. Shortly afterwards the animal commenced pawing with his fore feet, looking at his flank, which had become in a sweat, lying down, rising again almost immediately. The respiration and pulse became quickened, the temperature of the skin augmented, and the pulsations of the heart accompanied by a remarkable sound. On applying the ear to the side and upon the windpipe, a sound was heard similar to what rubbing dry parchment together would produce, and besides the sound of fluid within, particularly on the right side. The next day the sound of fluid had become still more distinct, and yet the animal appeared better and commenced feeding; the third, the pulse and respiration more frequent, the latter also short and embarrassed and threatening suffocation. On the fourth day the pulse became intermittent, as well as the pulsations of the heart, which were now more distinct on the right than on the left side. Fifth day, pulse feeble and intermittent, respiration impeded, pituitary and conjunctive membranes violet-coloured, skin bedewed with cold sweat. The breathing gradually became more embarrassed, and the animal, growing weaker and weaker, died without a struggle. Pleura of the left (right?) side covered with false membrane, yellow, consistent, and several lines in thickness; about ten *litres** of grey serosity within the cavity, floating in which were flocks of lymph; pericardium covered with false membrane, and containing several *litres* of bloody serosity.

This experiment, several times repeated, constantly offered the same results. Among others, one horse, destroyed fifty hours after having been injected, contained twenty-five *litres* of citrine serosity with yellow, thick, false membrane enveloping the costal and pulmonary pleuræ. These prove that effusion, both of lymph and water, may take place in a few days, and that they are not, as was formerly believed, the effect of chronic inflammation.

HAMONT obtained precisely the same results from a horse into whose left pleural sac he injected seven ounces of a weak solution of tartaric acid, and the next morning repeated this injection, and whom twenty minutes afterwards he destroyed, while he was in a state of tremor and agitation of breathing. Opened immediately, in the left side was found some of a citrine liquid; pleura injected and reddened; diaphragm and pericardium covered with a thin layer of soft lymph; lungs pallid and collapsed. On the right side the pleura was transparent without any injection of its vessels.

DELAFOND's experiments, twenty-two in number, lead us to the same conclusion, although they were instituted with other views, viz., for the purpose of ascertaining the pathognomonic characters of pleurisy. They have shewn that the commencement of pleurisy is the period most difficult of recognition; that the signs furnished by effusion were most to be depended upon; that in the horse, on account of the structure of the mediastinum, no certainty could be

* The French *litre* is rather more than $1\frac{1}{2}$ of an English pint.

arrived at concerning right and left pleurisy; but that in the dog it is still possible to maintain such distinction, the mediastinum of that animal offering sufficient resistance in some cases to confine the fluid within the cavity into which it is effused. Even in this subject, however, such does not always happen.

THE PLEURA BECOMES ALTERED IN STRUCTURE in chronic or relapsed cases of pleurisy. It gets thickened, indurated; grows tough and apparently less vascular, and assumes a morbidly white aspect. In other cases I have seen it studded with little knots, like tubercles.

THE SEROUS MEMBRANES in the horse are exceeding apt to fall into a morbid or disordered condition simultaneously; rather, I should say, through some peculiar diathesis of body than by sympathy, though I have no doubt there are cases in which the latter has considerable influence. This accounts for our meeting with water in the chest, pericardium, and abdomen—and head too, perhaps—in the same subject; of which there are many cases on record. It also forms a reason for unsuccessfulness by the operation of *paracentesis*.

PLEURO-PNEUMONY.

Pleuro-pneumony and *pneumo-pleurisy* are the names given to that extensive inflammation which involves both lung and pleura; the one or the other of them being considered the more proper according to the part in which the disease predominates. I have before stated that the majority of cases of what, in common language, are called “inflammation of the lungs” belong to this compound class; an observation in accordance with that, I believe, of our best veterinarians. A French writer, Delafond, denies this, and by way of proofs brings forward fifty-five cases of horses that have died of disease of the chest, out of which twenty-seven were pneumony, fifteen pleurisy, and but eight pleuro-pneumony. However, he has very properly qualified his observation by remarking, that locality, constitution, and certain unknown agents—such as produce epidemics—may have considerable influence. Although I do not assent to Delafond’s computation, yet his remarks must be admitted judicious and his inferences sound:—“If experience,” says he, “has proved that, *cæteris paribus*, pneumony is more easy of cure

than pleurisy, and that the two diseases united are more formidable and oftener fatal, is it not a reason why a veterinarian jealous of his reputation should be able to distinguish one from the other? But, how is he to acquire that diagnostical precision, unless through the valuable aids of percussion and auscultation? By these unerring lights, the practitioner will see his way sufficiently clear to employ this or that medicament according to the nature, seat, and duration of the malady. Such alone constitutes rational practice. And, to go a step further, how much better a situation will he be in then, to inform his employer of the probable result of the case?"

THE SYMPTOMS of pleuro-pneumony, as might be predicated, are those of pneumony and pleurisy combined, the one or other prevailing according as one or other disease predominates. Although some French writers have given descriptions of this, distinct from those of the other two maladies, I do not discover that they have succeeded in eliciting any pathognomonic signs, save such as are obtainable from percussion and auscultation.

THE TREATMENT must likewise be of the same compound character, partaking of what is recommended both in pneumony and pleurisy; making it bolder or more active, and modifying it, according as the case shall evince more of one disease than of the other.

HYDROTHORAX.

HYDROTHORAX, or *water in the chest*, is, as we have seen, a very common termination of pneumony with pleurisy; it may also follow bronchitis; and it may occur without any detectible disease or inflammatory action whatever about the chest. As a serous membrane the pleura may pour forth fluid into the chest, in accordance with the same law by which other similar parts become dropsical, either from some constitutional diathesis, or from some local disposition. I repeat, this is possible, and has occurred; but it is a rare case indeed, compared to those wherein hydrothorax supervenes upon inflammatory action, and that of a sub-acute or chronic nature. There are, again, certain dropsical states of body in which hydrothorax, ascites, and hydrocephalus, all co-exist; and are accompanied by swelled legs, sheath, belly, &c.

When inflammatory action within the chest, though subdued, is not removed, but continues creeping on, as is indicated by the pulse and other febrile symptoms remaining,—the patient not rallying as he might be expected to do, but feeding daintily, looking dejectedly, or spiring up for one moment (at the sight of food, perhaps), to be again downcast the next,—there is great reason to apprehend that the chest is filling with water; we should, therefore, lose no time in seeking confirmation from such

SYMPTOMS as follow:—Short, quick, laboured respiration: during the latter stages, when the chest is nearly full of water, the distressed animal is seen to exert to the utmost every inspiratory power he possesses. Should the patient lie down, which is seldom the case, he cannot long remain down; and the side upon which he lies is the one that contains the—or the most—water. D'Arboval says the intercostal spaces are enlarged. The pulse, which is small and quick, as the disease advances, becomes quicker and less perceptible, until, at length, it cannot be felt at all at the jaw. The horse, led out, walks with his fore-legs wide apart, and stiffened, and is often unsteady, and reels in his gait. The breast, belly, and sheath, shew dropsical swellings, which, by degrees, fall into the legs.

AUSCULTATION AND PERCUSSION.—Unless gas or air be present with the water in the chest, which can be but rarely the case, it is now ascertained, that—so far from any undulation or fluctuation or bubbling sound being perceptible, as so many have fancied they have heard—hydrothorax is denoted by an absence of all sound. There is no murmur, no resonance on percussion, in fact there can be none in such regions as are occupied by water alone.

WATER IN ONE OR BOTH CAVITIES OF THE CHEST.—Touching this part of our subject, some new light appears to have been shed upon us by some French veterinarians. Rigot in 1827, Delafond in 1830, and Bouley in 1836, have invited our attention to the new fact of the mediastinum of the horse being so constructed as to admit of a communication between the two pleural sacs. They say,

The mediastinum of the horse possesses neither the aspect nor the texture of the pleura: it is thin, diaphanous, delicate, composed of loose filaments,

crossing one another in every direction, and forming a transparent tissue, bearing the closest analogy to the woof of lace. The areolæ, close together, and hardly perceptible in the young subject, grow larger with age, and soon render visible, here and there, a multitude of round or irregular apertures, which establish a direct communication between the two pleural sacs. This is a peculiarity important to become acquainted with. It explains the gravity of chest-effusions in horses; it renders obscure and difficult of distinction the side affected in pleurisy, since the fluid runs from one cavity to the other, and thus gives rise to double hydrothorax. It is certainly *possible* for the fluid to pass through the natural openings, enlarged, of the mediastinum; but Delafond has discovered in eleven cases of pleurisy, that, in fact, there was a rupture of this frail partition. The same skilful veterinarian has remarked, however, that this communication is not invariably present, although there may be effusion in both pleural sacs. He has twice found it wanting.

THE TREATMENT OF HYDROTHORAX is an affair of desperation. We have more chance of succeeding in attempts to prevent than remove it; we must, therefore, endeavour to check the disposition to or avert the secretion. We must not suffer inflammatory action, however apparently trifling in degree, to lurk about the chest; but by continued depletion, sedative medicine, and derivatives, persist in our efforts to subdue it, or translate it to parts where it cannot do the same harm. In sub-acute or chronic pectoral affections, which, I repeat, especially are likely to end in effusion of water, we must—if the patient will no longer bear large ones—still persist in small blood-lettings: three or four pints even will often do good in advanced stages. And in giving medicine now, our principal object must be to increase the action of the several emunctories of the body—the bowels, the kidneys, the skin; though on the last I fear we possess but little power. We may give with great advantage small doses of aloes, in combination with calomel and digitalis. I would give daily this ball:—

Take of Barbadoes Aloes.....	ʒss
Calomel	gr. xv
Digitalis	ʒss
Tartarized Antimony	ʒij
Soft Soap sufficient for a ball.	

Should the dung become soft, let the ball be discontinued for a day or two, it not being intended that the patient should purge. Gohier speaks in high terms of cantharides as a remedy for inci-

pient hydrothorax. Knowing its active diuretic properties, I have often been induced to give it in cases of dropsy, and, I think, with advantage, but not in the large doses. Gohier gives from a drachm (*gros**) to a drachm and a half daily, incorporated with double the quantity of turpentine and aloes, and a sufficiency of honey, divided into two or three doses, and finds it produce copious evacuations of urine, and, in some cases, slight excoriations about the mouth and inside of the lips. To these observations, D'Arboval very properly subjoins, that as cantharides is one of that class which we denominate irritating poisons, and is sometimes attended with very violent action on the bladder and mucous membranes in general, we ought narrowly to watch its operation. Debaux and Vaison have derived benefit from the exhibition of large doses of tartar emetic: from 4 to 6 drachms (*gros*) a day have brought hydrothoracic patients round into a state of convalescence in three days.

PARACENTESIS, or *tapping the chest*, has been, by different veterinarians, resorted to as a remedy where a quantity of water is known to have collected. Lafosse, years ago, declared it to be a cure for hydrothorax consecutive to inflammation. He recommended that about half the fluid collected should be drawn off, and that then about the same quantity of vulnerary decoction should be injected. Two hours afterwards he draws off two-thirds of the remaining water, but injects only one-third. In two more hours he empties the chest, and throws in about $3\frac{1}{2}$ pints (2 *litres*) of the same decoction diluted. Gohier, from unsuccessfulness in many cases, and from often having seen it do mischief, has altogether relinquished the operation. Massot cured a mare, seven years old, by tapping.

This mare had, six months previous, been the subject of acute pleurisy, which left these symptoms:—skin dry, coat pen-feathered, gait unsteady, extremities cold, pulse slow, membranes pale and infiltrated; fits of coughing on the least exercise; pupils dilated, stupor, oppressive breathing, pain of the right side of the chest, elevation of the ribs, with considerable œdema of the part, which accounted for the dull sound on percussion. The ear, applied above the sternum, detected a dull protracted rumbling sound, similar to what liquid within a rolling cask would make. The therapeutic

* A *gros* is equal to 3,82 grammes, of 15,438 grains troy, each.

means employed having proved of no avail, and the animal being threatened with suffocation, Massot decided on puncturing the chest between the 5th and 6th rib, behind and upon a level with the point of the elbow. Through this aperture six pints of limpid serosity first flowed; afterwards it came yellow and thick, and, at length, like to coagulated albumen. A month after the operation the mare performed a long journey.

MY OWN PRACTICE has proved unsuccessful. I have frequently performed tapping, and as frequently failed in any good result.

From one old horse I drew off ten gallons of water, seven quarts from the left side, and thirty-three from the right side. He died on the fourth day succeeding the operation, without having been in the least relieved by the evacuation. After death, six gallons more were found within the chest, and one quart within the pericardium.

In another case I drew twelve quarts of water from the left cavity; and, five days afterwards—the animal not having experienced any relief—five quarts were taken from the right side. By the last evacuation the symptoms appeared to have been aggravated. Death ensued on the third day after this last operation. Fluid was found within both pleural sacs, amounting altogether to three gallons, and there was mingled with it a quantity of purulent matter.

SUCCESS IN OUR OWN COUNTRY.—It now becomes my pleasing duty to lay before my reader some accounts of cases of success, and that of a most unequivocal description, which have occurred to British veterinarians. The first is one furnished me by Professor Sewell.

On the 16th of August, 1824, a bay horse, five years old, was admitted into the Veterinary College for pleurisy: the attack had commenced the week before, and he had been bled and rowelled, and had taken laxative medicine. The animal had much wasted in flesh, and, on being led to the stable, was observed to falter in his step, as though he were very weak. The respiration was oppressed and quick; the pulse 75; and the other symptoms present were such as to indicate hydrothorax. He was bled again; took aloes ʒss; was turned into a cool situation; had his legs flannel-bandaged; and was ordered a light diet. The day following, when the ear was applied to one side of the chest while the other was struck, undulations were perceived most distinctly on the right side. A trocar was plunged into the left cavity, and about an ounce of fluid issued. But from the right, which was next punctuated, four gallons of serous fluid were drawn. Abatement of the respiration and pulse followed the operation. The next day—the 18th—the respiration was less oppressive, the pulse 50, the bowels open, the appetite improved. The left side was tapped again; but without effect. On the 19th the respiration tranquil, pulse 45—the right side was trocared again: two gallons more were evacuated.

Green vitriol ʒss given.—22d, General amendment; pulse 40. The right side once more tapped; but this time with no result. Repeat ball.—26th, Pulse 36: discontinue ball. From this period he gained flesh surprisingly fast. November 7th, being considered sufficiently recovered to leave the College, he is discharged, "cured." On the 7th of January following he experienced a fresh pulmonary attack while at straw-yard; but no symptoms of effusion appeared, and all passed off again. After this he continued in health for two years, and was then sold.

THE SECOND CASE OF CURE is one highly creditable to the curer—Mr. Webb, of Whitechapel—"although not a *graduated veterinary surgeon*." It is contained in THE VETERINARIAN for 1835.

The horse belonged to Mr. Batley, of Whitechapel, who bought him at a country fair. He is eight years old, and cart-bred. On the 30th September 1835, I was requested to attend him. I saw him at nine o'clock in the evening. The conjunctive and Schneiderian membranes were highly injected; the extremities excessively cold; the mouth hot and dry; the breath hot; the breathing laboriously quickened: the inspiration lengthened, and the expiration rapid. The fore legs were wide apart, and, as it were, immoveable; anxiously regarding his sides. Head protruded; nostrils expanded. Pulse 97 and oppressed. The cause of the disease was change from cold to heat.

TREATMENT.—V.S. ad lbviiij from a large orifice, as much as he would bear. Soon afterwards he appeared much eased. Seton in the breast and one on each side; and to take calomel ʒss, nitre ʒi—flannel bandages. And in the morning to be led to my infirmary, the distance being short.—October 1st, Pulse 104. Repeat ball, with the addition of ʒij camphor.—2d, Better; pulse 85. Repeat ball with digitalis ʒss. Setons dressed.—3d, Pulse intermittent, from 60 to 75. Gave aloes and calomel, of each ʒss, digitalis ʒi, nitre ʒi, and dressed setons.—4th, Pulse lower, still intermittent. Ball repeated and setons dressed.—5th and 6th, The same.—7th, All the symptoms suddenly abated, when, suspecting what had taken place, I had recourse to paracentesis. I trocared the thorax between the eighth and ninth ribs. From the left side one pint of serum was obtained, but from the right, eighteen pints were abstracted.—8th, The animal being very much debilitated, I determined to give him tonic medicine. Blue vitriol ʒij, gentian ʒss, ginger ʒss, twice a-day.—9th, Tapped him again, and obtained from the right side five pints, but none from the left.—10th to the 16th, Tonic balls were given while he remained at my infirmary. Now at work, doing well.

THE THIRD SUCCESSFUL CASE is one sent to THE VETERINARIAN, in 1836, by Mr. Scriven, Aberford.

A bay horse belonging to the Union Coal Company, was on the 5th of January attacked with inflammation of the lungs. He was bled; had ʒij of

aloes given, and otherwise properly treated. On the 9th I saw him. The pulse was 60, hard and full; the heart bounding against the ribs; extremities cold; appetite much impaired. Draw four quarts of blood, and give nitre and emetic tartar, of each ʒij, digitalis ʒi, in ball, thrice a-day. Clysters occasionally; body and legs to be kept warm; mash and gruel diet.—10th, Much the same. Blister sides. Continue ball, &c.—11th, Pulse less full and intermittent; omit digitalis; continue other treatment.

16th, Pulse increasing. Very restless, pawing litter, and attempting to lie down, yet afraid to do so; fæces thin and fetid. V.S. three quarts, catechu ʒii, digitalis and opium ʒss each, night and morning.—17th and 18th, Better. Pulse 54; dung firmer; appetite better. Nitre and emetic tartar of each ʒij, night and morning.—22d, Very dull; appetite impaired; pulse increased; purging and fetid fæces. Catechu ʒij, opium ʒj, chalk ʒj, in gruel, thrice a-day. Starch injections.—23d, Still purging; appetite worse; becoming weak. Continue treatment, adding half a bottle of port wine to each dose.—25th, No better; losing flesh so rapidly as to extinguish all hope of recovery. Give night and morning chalk ʒj, catechu and opium each ʒj, Peruv. bark and gentian each ʒij.—27th, Purging subsiding. Appetite better. Discontinue the wine, but go on with the medicine.—28th, Purgation ceased. Appetite better, but has now great difficulty of breathing. Auscultation indicated great impediment in the right lung, and percussion elicited a dull sound. This night, on relating the case to Mr. Dick, he replied, from the account given, the continued purging and rapid loss of flesh, he suspected hydrothorax.—29th, Mr. D. went to see him, and became confirmed in his opinion. The effusion was chiefly on the right side: the left was nearly free. Paracentesis thoracis was at once determined on. A small incision was made with a lancet between the 11th and 12th ribs. The integuments being drawn aside, the trocar was introduced about four or five inches above the cartilages of the ribs, close to the anterior margin of the posterior rib, in an oblique direction, upwards and rather forwards. On withdrawing the trocar, the fluid appeared in a full and copious stream, which was allowed to flow as long as possible without the admission of air through the canula into the thorax. Eight quarts were withdrawn, and the skin allowed to close over the wound. The horse experienced great relief, and immediately began to breathe more quickly. The fluid on standing to cool quickly coagulated. About three-fourths of it assumed the nature of fibrine, and the remainder was of serous character. Give thrice a-day ferri sulph. et resin. aa ʒij, camphor ʒj.—30th, Eats better. Respiration more natural. Wound closed. Continue treatment.—31st, Auscultation detecting some fluid on the left side, paracentesis was performed; but scarcely a pint was abstracted. Continue treatment.

Feb. 3d, Pulse increasing; breathing more laborious; appetite declining; water re-accumulating in the right cavity. Operation again performed in the same intercostal space, but a little below the former opening. Five quarts were obtained in a full stream, which again appeared to afford great relief.

Continue treatment.—14th, Pulse rising. Add digitalis ʒj.—16th, Pulse diminishing; respiration not so laborious. Omit digitalis. Continue iron, resin, and camphor.—21st, Very restless; abdominal respiration laborious. Regards his sides, and drily sighs. Pulse hurried and irregular; extremities cold; symptoms altogether betokening speedy dissolution. Paracentesis once more on the same side and intercostal space, but with considerable difficulty. Three quarts were drained off, but the stream was much impeded, either by the adhesions of the pleura, or by clots of fibrine plugging up the mouth of the canula. The patient experienced much relief again, and once more rallied. Continue medicine.—March 3d, Has had another relapse—has been exceeding weak, and has lain down for the first time since his illness; but this so aggravated the symptoms and threatened life, that he only lay for a few moments at a time. He then rose in a staggering manner, and constantly regarded his flanks, as if pointing out the seat of pain and imploring relief. Paracentesis again on the right side, anterior to the latter puncture. This was followed by a copious flow of a turbid whey-like fluid, seemingly a mixture of pus and serum, which had a very offensive smell. It was allowed to flow as long as it would without the admission of air through the canula into the thorax. Eight quarts were taken away, from which the horse experienced more relief than from any previous operation. Continue treatment.—5th, Appetite amended, and has lain down two or three times. Treatment as before.—7th, Improves gradually; appetite increases; lies down frequently without seeming disturbance. Treatment continued.—12th, Feeds well and rests well. Continue remedies.—April 22d, Doing well. Mr. Youatt saw the horse on the 19th June following: he was then at work, and apparently well.

SOME IMPORTANT DEDUCTIONS are to be elicited from these cases: they have been recited in detail with a view also of affording such a connected and faithful history of hydrothorax, its progress, its varieties, its changes, and the manner in which it has been cured by paracentesis, as is not to be surpassed but by actual observation of the cases themselves.

TO PERFORM PARACENTESIS we require a *trocar*, and one longer and larger than surgeons use. The canula of the trocar I have measures four inches in length and five-sixteenths of an inch in diameter. That part of the thorax which is the most dependent, the most conveniently come at, and where no mischief can ensue from perforation, is to be chosen for puncture. I have generally myself operated between the eighth and ninth ribs, close to their cartilages. Mr. Dick operates—at least Mr. Scriven did—between the eleventh and twelfth ribs, about four or five inches above their cartilages.

The spot being determined on, the integument is to be drawn to one side, either by an assistant or with the operator's left hand, and through it, in a state of tension, is to be pushed, with a rotating motion, the point of the trocar, keeping it directed upwards and inwards as you proceed. Some make an incision through the skin with a lancet first, and I think it very advisable, on account of the facility it gives to the introduction of the trocar. The moment the trocar has cut its way through the wall of the side, which will be felt by the cessation of resistance, the stilet is to be withdrawn, leaving the canula within the wound, through which it must now be pushed as far as it will go, or until a copious stream of fluid runs out. Though the water may gush out at first, it seldom continues flowing long in a full stream; often, indeed, its stream becomes interrupted, or altogether arrested, either by the lungs coming against the mouth of the canula, or some flakes of lymph collecting about it or flowing into it, to remove which it becomes necessary to pass a whalebone or iron probe through the canula. From one or other of these causes, it has happened that no water has followed the introduction of the trocar, even though the cavity perforated has been full; as a general rule, therefore, do not withdraw the canula when no fluid issues, until quite assured that it is fairly within the cavity, and that its mouth is free from all obstruction. When the cavity is so nearly emptied of its water that fluid only issues in jets each time the lungs expand, the canula should be immediately withdrawn, else, during the intervals while no water is flowing, air will rush into the chest; and air within the thorax is said to do harm, and therefore we must avoid it. The valvular covering afforded by the return of the skin drawn to one side, will effectually close the wound after the operation.

HYDROTHORAX IS NOT NECESSARILY INCURABLE.—The cases I have recited prove this. Under what circumstances have we most chance of curing? Let us consult our cases again. We find that in all of them the water was confined to one—and that the right—side: the quantity in the left cavity was too inconsiderable to notice. This then—as appears in theory, so in practice—constitutes a favourable indication. We find again—with the exception of Magot's case, in which the quantity of water was inconsiderable,

and which, after all, looks like a relapse—that two of them were tapped in the second, the other in the fourth week after attack : none, therefore, could be called old or chronic cases. The secreting membrane could in neither case be said to have acquired any habit of secretion or any materially altered structure. *Age* may have some influence : Mr. Sewell's patient was five years old ; Mr. Trapp's was eight years of age. *Stamina*—healthiness of constitution and in other respects—must have great influence. All these particulars—and there may be others—ought, I repeat, to be taken into consideration in dealing with a case of hydrothorax.

ARE WE JUSTIFIED IN OPERATING IN EVERY CASE ?—This is a question somewhat difficult of solution. On the one hand, we are told that instances are to be adduced in which re-absorption of the effused fluid has been effected by treatment, and that, as there is great danger and but little chance of success attendant on paracentesis, we are certainly not justified in operating until every other means have been tried. On the other hand, the advocates for the operation tell you, that, unless you draw the water off *early* in the disorder, you have not the same chance of success. “ If,” says d'Arboval, “ we saw nothing in a dropsy beyond the unusual circumstance of water existing where there ought to be none, it is reasonable enough that we should let out the fluid, and thus perform the cure. But of what use can paracentesis be when the dropsy is dependent upon affection of the heart or large vessels, while the cause remains ? In the case of acute pleurisy, do we not, in the act of puncturing the chest, as well as by exposing a membrane, already in a state of intense inflammation, to the contact of air, create fresh irritation ? And, should the case be chronic, do we not run a risk of converting it into the acute, and thus destroying our patient ? In a word, paracentesis is an operation too perilous and too often fatal in animals for us to dare to countenance it. And besides, notwithstanding we may inject, there is the inevitable inconvenience attending it, of the pulmonary organs, in consequence of being no longer compressed and sustained by the surrounding fluid, falling suddenly into a state of collapse, a change bordering on death.” For my own part, where we have attended a case sufficiently to put our treatment to the test, and where, in

defiance of such treatment, it has gone on to produce hydrothorax—and such a hydrothorax as must inevitably cause the death of our patient, and that very shortly—I do not see what other reasonable course we have than to operate : it is true, we have but very slight hope of any good result ; but, having done all we can, like a drowning man, we are glad “ to catch at a straw.”

TREATMENT AFTER PARACENTESIS.—Should the quantity of water abstracted be considerable, I should advise the encircling of the thorax with some sort of bandage or roller, with a view of giving some support to the contained viscera : perhaps a broad circling would be the thing. The compression must be only such as can be borne ; and should it be found to inconvenience the animal, it must be immediately removed. In a medical point of view there are several objects to be fulfilled :—the watching of the inflammation, the support of our patient, the prevention of fresh effusion of water. The tonic-diuretic plan, I think, seems to have best answered. I would give preparations of iron or copper, in combination with emetic antimony, digitalis, gentian, turpentine, cantharides, &c. Either of the following balls may be given morning and evening, providing there are no inflammatory symptoms to interdict it :—

Take of Green Vitriol.....	ʒi ss	Take of Blue Vitriol	ʒj
Cantharides	ʒss	Digitalis	ʒss
Gentian	ʒss	Tartarized Antimony. ʒij	
Treacle sufficient for a ball.		Common Turpentine sufficient for a ball.	

In cases where great debility is left behind, not even tonics but *stimulants* may be required. Mr. Scriven gave his patient port wine. Under similar circumstances I am in the habit of giving malt liquors—porter or ale. Here, also, a nutritive but soft or easily digestible diet should be allowed.

* * P.S.—The following potent counter-irritative had well nigh escaped observation :—Mr. Simpson, V.S., Southampton, has, at the suggestion of Mr. Chapman, lately been in the habit of employing as an application to the chest, even in preference to blisters, in cases of pleurisy, two drachms of tartarized antimony dissolved in two ounces of oil of turpentine. By repeating it often, he finds he can produce “decided effect, even after blisters have totally failed.”

ADHESIONS.

IN speaking of the effusion of lymph as a sequel of pleurisy, I described it as assuming in the dead body various forms—such as bands, filaments, cobweb, &c. When any of these are found attached to the opposed surfaces of the pleura, in such manner as to establish partial unions between the pulmonary and costal portions of that membrane, they are called *adhesions*. As such, they may either consist of recent exudations, and consequently, from their extreme softness and want of tenacity, be very liable to be torn through, leaving pendulous shreds in their places; or, they may acquire firmness and consistence, and in the end become organized and established as adhesions. At first, they probably give rise to more or less pain, from the inconvenience they occasion to the play of the lungs within the chest; though after a time this uneasiness would appear to cease or diminish, from the adhesions becoming stretched and elongated. It is not often, however, that we find old or permanent adhesions in horses—not near so frequently as in men; and the reason seems to be, that horses are not in general the subjects of those chronic attacks and relapses of pleuritic disease to which, in our changeable climate and with our irregular habits of life, our own bodies are so obnoxious. For an account of the formation of adhesions, and of the short period of time in which they are occasionally produced, I must refer my reader back to “Effusion.”

HEMORRHAGE FROM THE LUNGS.

HÆMOPTYSIS—as this hemorrhage is named—is not a frequent occurrence in horses; and though in some instances under our controul, in others it is highly dangerous, and now and then proves fatal, without a chance of saving the patient. In fact, all this depends upon the nature of the case, there being three sources from which the bleeding may proceed:—from the bronchial membrane; from the air-cells; from lesion in the substance of the lung. Horses whose sanguiferous systems are in a state of plethora from fat or high condition, and whose work, though trifling in general, is apt on occasions to amount to violent efforts, are the especial subjects of hemorrhages from mucous membranes. These membranes in such

habits as theirs are overcharged with blood, and consequently, on any extraordinary effort or exertion, are liable to give way—to have their loaded and distended vessels ruptured; though the emission may be owing to over-force of circulation, and, thus arising, be said to be “spontaneous.”

There is a form of hæmoptysis, described by Laennec, on account of its anatomical characters, under the appellation of “pulmonary apoplexy,” which is produced by an effusion of blood into the air-cells. It is manifested after death by patchy indurations of a very dark red, whose interior is granulated the same as hepatized lungs; though in other respects these two pulmonic indurations are entirely different. I have seen and recorded something like this in horses: but I cannot just now lay my hand upon the cases.

LESION OF THE SUBSTANCE OF THE LUNG, I apprehend to be the cause of the hemorrhage in those cases of hæmoptysis in which death happens suddenly and without any previous or premonitory ailment. The horse, during work or exercise, or, it is possible, in the act of excessive coughing, staggers, falls, and dies. My respected predecessor, Mr. Bloxam, has within the space of nine years registered three cases of this description: one is entered as “hemorrhage in the lungs;” the other two as “effusion of blood in the lungs;” and one of the three horses dropped down and died while exercising in watering order. Hunting, racing, hard bursts of galloping of any kind, dragging heavy loads, are all occasional causes of this description of hæmoptysis. The same may likewise happen from ulceration of the lungs in phthisis.

THE SYMPTOMS of ordinary hæmoptysis—that which arises from emissions from the bronchial membrane—are, defluxions of blood from both nostrils, commonly of the arterial character and frothy, attended with more or less irritation, coughing or snorting, and perhaps disturbance in the breathing; and every time the horse coughs or snorts fresh quantities are ejected, and often through the mouth as well as nose, and mingled with these ejections will sometimes be found various mucosities. The blood does not run in one uniform stream, as in epistaxis, but is influenced by the respiration and position of the head and neck. The other distinctive signs between the two hemorrhages will be found under epistaxis.

TREATMENT.—The cases we have in general to treat being such

as arise from plethora, and over-action or excitement, we must seek for a remedy that will reduce fulness of blood, and abate over-action and excitement: this is to be found in blood-letting. The evil is to be met by its like—*similia similibus*.

When the condition and powers of the horse are such as will bear it, we may at once abstract a large quantity of blood, with the two-fold view of temporarily fainting the animal and permanently debilitating his constitutional powers; but should he be in a state of low condition, or have already become reduced by repeated hemorrhages, though blood-letting still may be admissible, yet our object must be to abstract as large a quantity of blood in as short a time as possible, in order to produce some approach to syncope, without any great deal detracting from the present weakly state of the system. To do this, we should make a very large orifice in the vein; or, what is better practice, draw blood from both sides of the neck at the same time. After blood-letting, take all clothes off the horse, and let them remain off, and dash ice-cold water against his sides and breast: ice itself applied to them, could it be got, would be likely to do good. Empty his bowels by injections: Rodet recommends "lavemens d'eau pure *très-froide*," with which, and blood-letting, he says he has had great success. Let his diet consist of nought but bran-mash and cold water. Keep him constantly tied and racked up, with his head elevated, and do not suffer him to lie down, or to move about, or be in any way disturbed. The medicine given with the best effect in man is the superacetate of lead: it is one which has not, I am afraid, much effect in horses; nevertheless, it may be worth while to try it. It may be given in combination with the common purging mass, in the proportion of a drachm of the salts to two drachms of the mass, twice a-day: diminishing or withdrawing the latter altogether should purgation come on.

BROKEN-WIND.

THE appellation "broken-wind" is apt to convey to an unprofessional or unequestrian mind a meaning very different from that which we, from established habit, naturally, as it were, attach to it; and there can be no doubt, I think, but that those who first gave this appellation to the disorder did so from the circumstance of the

horse affected with it being observed continually to be *breaking wind*, in the sense we use that phrase; although the late Professor Coleman, whose theoretical ingenuity was proverbial, was wont to turn the word "broken" to his account, while discoursing on his favourite theory of ruptured air-cells, by saying, that those who gave the name to the disorder evidently must have known that something—the lungs, most probably—was *broken*. Judging, however, of the pathological knowledge possessed by the old writers on farriery by what is displayed in the works they have left us, I must repeat my opinion—and this opinion seems to be confirmed by a disgusting operation they sometimes performed for the disorder—that in the *flatus* passed from behind will be found the derivation of this remnant of the cant phraseology of farriery. Be this, however, as it may, it is a name by which the disorder is still universally known amongst us; and the only way I see of forcing it into direct application, is, either to admit with Professor Coleman that it implies the rupture we find in the lungs, or to deem it indicative of the peculiar—double or *broken*—sort of respiration that attends broken-wind. So that, in fact, it may either imply a symptom or be significant of the pathological condition in which we commonly find the lungs of broken-winded horses after death.

THE DISEASE ITSELF—for as *disease* we are bound to consider it—is so self-evident, so palpable to demonstration, that almost every person conversant with horses* is able to discover it; and well enough knows, when it does exist, how valueless the subject of it is compared to a sound-winded horse. Notorious, however, as it is, yet have the opinions concerning its seat and nature been, from very early times up to the present, both numerous and discordant: indeed, no malady has given rise to such a multiplicity and conflict of opinions as the one before us.

HISTORY.—I shall pass by unnoticed all the ancient part of the history of broken-wind—seeing no other purpose its relation could serve than that of curiosity—in order to be able to come at once

* The French veterinarians, Godine, Dupuy, Demoussy, Delafond, D'Arboval, assert that sheep and oxen are subject to broken-wind; and that in them it is occasionally dependent on lesion of the heart. I cannot pretend to offer any opinion on this point myself; but my friend, Mr. Youatt, assures me he never saw nor heard of such a case.

to those theories of its nature entertained by one set or other of veterinary nosologists at the present day. For those in vogue on the continent we have the best authority in citing from Hurtrel D'Arboval :—

CONTINENTAL.—According to this writer, these may be considered under four heads :—1st, Pulmonary Inflammations; 2dly, Nervous Influence; 3dly, Lesion of the Diaphragm; 4thly, Pulmonary Emphysema.

PULMONARY INFLAMMATIONS, in their *acute* form, are not to be regarded as forerunners of broken wind: it is only when they are *chronic*, and are productive of certain morbid alterations or disorganizations, that they can be so viewed. Acute pneumony, however intense, however extended, is never known to terminate in broken-wind. Chronic bronchitis, accompanied with thickened membrane and mucosities, has, by Rodet, been placed in the first rank among the causes of broken-wind; while Delafond regards it as but of secondary importance. It is conceived to occasion broken-wind by the violent fits of coughing accompanying it. The air violently forced out and meeting with (mucous) obstruction in the passages, by the re-action of its impulsive force, is driven back into the small bronchi and air-cells, which may thereby become dilated, or even ruptured. This double result has been observed by Laennec, and adopted by Godine, Rodet, and Delafond. It is possible, also, that, through ulceration and perforation of the bronchial membrane, air might get admission and create an inter-lobular pulmonary emphysema. All these explications, however, fall to the ground in cases wherein no emphysema has been observable; of which kind there are three reported by Rodet.

NERVOUS INFLUENCE.—This, which originated with Dupuy, is, in D'Arboval's estimation, the most accurate opinion of any. Some anomalous condition, but little known, hardly suspected even, of the pulmonary nerves, preceded by such circumstances as in connexion either with the lung, the stomach, or other part, or through sympathy, are capable of altering the structure of these nerves, or of influencing their functions. Both Dupuytren and Dupuy have remarked symptoms resembling those of broken-wind in cases of compression or section of the pneumogastric nerves.

LESION OF THE DIAPHRAGM.—Girard, jun., in 1822, remarked symptoms of broken-wind in a horse whose dissection afterwards shewed that a portion of omentum had insinuated itself through an opening in the diaphragm into the chest. In another case, treated by Dendry, a knuckle of intestine had got similarly lodged. From these and other recorded cases, nothing, after all, can be elicited which throws any light on broken-wind.

PULMONARY EMPHYSEMA, if not the most influential, is the most frequent of the proximate causes. It constitutes also the most succinct of all opinions; and one to which the labours of Laennec and Andral have added very little.

Delafond's account being the best veterinary one, although he has confounded dilatation of the air-conduits with the extravasation of air. We shall transcribe it :—

THE AIR-CELLS are little transparent vesicles or culs-de-sac, having partitions of dense cellular tissue, by which they are united into small masses or lobules, rendered distinct by the looser cellular tissue which surrounds them, and connects them with other lobules. In domestic animals the form and number of the air-cells vary, not only with the species, but in individuals of the same kind, according to the age and to the part of the lung they occupy. In young horses and in foals they are small, and closely grouped together, which gives gravity to the lung, and at the same time elasticity; but with age they become dilated, atrophied, and in part destroyed; which renders the lung lighter, less elastic, softer, and of a paler colour. The air-cells are more numerous in the centre of the lung than at the extremities; but are most capacious and at greatest interval within the anterior lobes. This distribution explains why the respiratory murmur is more audible at the middle of the lung.

ENLARGEMENT OF THE AIR-CELL has been observed to the extent or more of a pea. But they are very rarely found enlarged in every part of the lung: the anterior lobes, and borders, and mediastinal portion of the right lung, frequently exhibit them; and in the middle of the sound lung are here and there found dilated air-cells; and often these two latter states are combined. When the dilatation of the cells is general, the lungs, on opening the thorax, appear as if they had been inflated. The atmospheric pressure collapses them only to about one-third or one-fourth of their volume. They are of a pale rose-colour, elastic, and extremely light; and more buoyant in water than sound lungs. In general their cells have acquired the volume of a millet or hemp seed, and particularly in the anterior lobes, and along the posterior and inferior borders of the lungs. The parenchyma, on being cut, collapses only to the extent of the incision; and there is no effecting a perfect collapse of it without incising it in every direction. Squeezed between the fingers, it crepitates, and emits upon the surface numerous little globules of air. If attempts be made to collect this air underneath the pleura, it escapes into the interlobular cellular tissue, and becomes collected into small bladders between the lobules.

In the second kind of dilatation of the air-cells—that which is *local* or *partial*—when in the anterior lobes they present a sort of rumpled semi-inflated appearance, of a pale rose-colour, and consist interiorly of air-cells dilated to the size of a pin's head, or from that to a millet-seed. Deep incision, laying open a bronchial tube, collapses them; but pricking with a pin does not. Circular compression upon any part effects perfect collapse, the air escaping into the bronchia. The mediastinal lobe of the right lung, thus affected, presents similar characters; but when the local dilatation occupies the borders of the lungs, it shews itself in extensive, not prominent, rose-coloured irregular eminences, and the parts appear swollen, and inwardly dia-

play very distinctly the air-cells become enlarged and more transparent. The lung pits from the pressure of the finger, and the act of pression, dispelling the air, occasions slight crepitation. Inflation of the entire lung causes the rumples and eminences to swell before the remaining sound portion receives the air.

In the third kind, or *broad-cast* air-cell dilatation, slight elastic eminences are perceptible, paler in colour than the sound parts, and varying in magnitude from a lentil-seed to a hazel-nut or walnut. These eminences are spread about upon the surfaces and borders of either one or both lungs. Sometimes they are very numerous: Delafond has counted as many as thirty-five upon the surface of both lungs. Like the large rumples, they collapse by incision; and when the lung is gently inflated through the windpipe, they swell and rise towards the surface before the surrounding parts become inflated. The middle of the parenchyma is not exempt from these alterations. To demonstrate this, expose the whole lungs to the air for twenty-four or thirty-six hours, and afterwards incise them in all directions. The incision, commonly of a reddish-black, is marked with bright red spots, variable in size, of which the most superficial communicate with the exterior eminences. They are occasioned by the chemical action of the atmospheric air remaining within the dilated air-cells of the globules on the colouring matter of the blood effused in the surrounding tissue.

With the three kinds of dilatation just described we sometimes meet with dilatation of the small bronchial tubes running to the lobules increased in volume. These minute divisions, unprovided with cartilaginous rings, have been discovered double the diameter they are in a sound state. The membrane lining them is pale, thin, and coated with a clear and plastic mucus.

Now and then we find a middle-sized bronchial tube dilated, which is supplying several morbid lobules. This especially happens in emphysema resulting from chronic inflammation of the mucous membrane, accompanied with abundant secretion; and these dilatations are attended with separation of the cartilaginous rings, and with paleness, ulceration, and even perforation of the internal coat. In this case the bronchia, and particularly such as are dilated, contain a white, plastic, inodorous mucus.

Whether it happen that one or more air-cells become suddenly ruptured from some effort, or whether the same happens to air-cells already dilated and attenuated, or whether the breach is the result of ulceration and complete perforation of the membrane, air makes its escape into the interlobular cellular tissue and produces emphysema. If in this condition the lungs be examined soon after death, the pulmonary lobules will be found more or less isolated, in consequence of the extravasated air separating them from one another. This stream of air may be made by pressure to pass from one cellule to another, and to form bubbles or vesicles, of an indefinite shape, and of volume varying from that of a lentil to a nut, or even to a large hen's egg. They occupy particularly the borders and extremities of the lobes, and often

have the pleura for their boundary, which itself becomes raised by the air underneath. Pierced with a pin these little bladders, as well as some of the neighbouring vesicles, empty themselves completely. Moderate insufflation of the lung expands simultaneously the pulmonary vesicles and meshes of the cellular tissue; more force sends the air underneath the pleura, and produces large bladders along the borders and extremities of the lobes.

Inter-lobular emphysema is often combined with air-cell dilatation; sometimes with bronchial dilatation; rarely with varico-aneurismal dilatation of the small vessels underneath the pleura.

THE ENGLISH HISTORY of broken-wind will be found but meagre compared with the continental. Most of our earlier writers on farriery derived their explications of its pathology from human medicine; while the moderns, with few exceptions, have embraced the doctrine of emphysema.

THE DOCTRINE OF RUPTURED AIR-CELLS, according to Mr Bracey Clark, originated in this way:—"In the year 1795, being engaged in the dissection of a grey mare, sent to the Veterinary College to be destroyed on account of this complaint, on opening the chest the lungs appeared free from inflammation, being very white; and, as they appeared free from redness and increase of colour, the general concomitant of disease, we were led for awhile to consider the lungs as not the seat of the disorder, as others had done (for several pupils were present at the dissection). On cutting into their substance no inflammation was perceivable. On examining them more closely, we observed a small bladder or vesicle on the outside of the lungs, in the external investing pleuritic coat: this was conceived by some who were present to be a tubercle, and that tubercles might be the cause of broken-wind. Suspecting, however, from its appearance that it was not solid, but contained air, it was punctured, and immediately subsided. This instantly suggested to the writer (Mr. B. Clark) that the lungs were actually in a state of *emphysema*, or that air was contained in a state of extravasation within their substance, and which not only seemed evidently the case in this instance, but we have since fully verified it by examination and dissection of a considerable number of cases of broken-wind, and found it is a constant appearance. This extravasation of air in the substance of the lungs is, perhaps, occasioned by rupture of the air-cells, as suggested by Mr. Coleman at the time; unless it is formed in them, and thrown out by some morbid operation of the bloodvessels, as sometimes happens in the intestines and vagina; for the exact way in which this emphysema arises has not yet been ascertained."

MR. CHERRY, the Principal Veterinary Surgeon to the Cavalry, happening in the year 1823 to have a strikingly well-marked case of broken-wind in his infirmary at Clapham, was kind enough to inform me he would have the horse destroyed any day I would be present.

Accordingly, I attended, and no sooner was life extinguished than we removed the lungs, trachea, and larynx from the body, and submitted them, as yet steaming with vapor, to close and careful examination. The general aspect of every part was that of perfect health: only the lungs were paler—being of a light pink hue—than they generally are at this time of life—eight years old. The pleura was everywhere in apparent health, except in those places where it was elevated, by air underneath, into vesicles; there, it was opaque and whitish, giving the vesicles the appearance of so many white tubercles. The vesicles were most numerous and conspicuous upon the anterior lobuli; but both lungs had, in every part, a crackling emphysematous feel, and the air they contained could be readily made to traverse their substance by compression. They were remarkably buoyant in water; particularly the anterior lobes. When inflated, the air appeared to distend the parenchyma; but what seemed very remarkable, *it neither increased the number of the vesicles, nor enlarged those already existing.* After inflation, the entire lung became still paler, and crackled more when squeezed with the hand. This Mr Cherry thought arose from the rupture of more cells; I had, however, and still have, my doubts on that point. The bronchial and tracheal membranes, though of their natural colour, were *much thickened*. The membrane covering the arytenoid cartilages was *likewise thickened and studded with little hard papillary eminences*. There was no alteration in the form of the trachea.

IN THE FOREGOING PATHOLOGICAL ACCOUNTS, two morbid states demand our particular attention: these are, *emphysema of the lungs*, and *alteration of the membrane lining the air-passages*. It is the former, however, which has—perhaps from its presence being more constant and uniform—in an especial degree attracted the attention of veterinarians, of our own country in particular; and to that degree that some—among whom stood prominent the late Professor Coleman—unhesitatingly asserted that emphysematous lung constituted the pathology of broken-wind. In this advanced state of science, however, we dare not hasten to such a conclusion before we have examined and well weighed in our minds some facts which appear to militate against this doctrine. That broken-wind, or a disorder undistinguishable from it, may arise and yet

EMPHYSEMA NOT PRESENT, we have unquestionable authority for affirming: in France, Godine, Volpi, Rodet, D'Arboval, and Delafond; in England, Professors Sewell and Dick, Messrs. W. Smith and Hallen, have all published statements to the contrary*.

* To be found in THE VETERINARIAN for 1837.

Even Delafond, who is the greatest French advocate for the emphysematous theory, avows that out of fifty-four broken-winded horses he examined, he found forty-five with emphysema, including dilatation of the air-cells of the lungs: from which he concludes that only about three-fourths of the cases of broken-wind are of this nature; leaving one-fourth to arise from other causes. Although the fact, that symptoms of broken-wind may issue from other pathological conditions appears irresistible, still are we left in a position fearlessly to pronounce, that the ordinary—by far the most frequent—accompaniment of the malady, is emphysema.

DOES EMPHYSEMA EVER EXIST WITHOUT BROKEN-WIND?—

Yes, of one description, but not of the other. For emphysema of the lungs, which was first observed by Dr. Baillie, but afterwards more fully investigated and explained by Laennec, is, according to the latter, of two kinds—vesicular and interlobular. *Vesicular* or *pulmonary* emphysema consists either simply in the dilatation of the minute bronchia and air-cells, or in the rupture of the parietes of several contiguous cells and their consequent dilatation into one; *interlobular*, in the infiltration of air, in consequence of rupture of the membranous partitions between the lobules of air-cells into the cellular tissue interposed between the lobules, and connecting them together. Mr. Stokes*, however, has very properly objected to the simple *dilatation of the air-cells* being so classed, “inasmuch as emphysema is not the principal characteristic of the disease, and though a frequent yet by no means a constant complication.”

Laennec says the dilated cell, though it commonly does not exceed a millet-seed, may reach the magnitude of a cherry-stone or French bean; Dr. Townsend†, however, in more than one hundred dissections which he made of emphysema, “never, except in one instance, saw the air-cell dilated to the size of a garden-pea.” In the majority of cases, such cavities are formed by several cells being thrown into one, in consequence of their delicate partitions being overstrained or ruptured. In this manner, one entire lobule may become one cell; or the interlobular partitions may themselves be

* In his Treatise on the Diseases of the (Human) Chest.

† In an excellent article on Emphysema, in the Cyclop. of Pract. Medicine.

lacerated, "and their respective lobules thrown into one large cavity, which usually reaches the surface of the lung and forms a projection under the pleura*."

I have myself on several occasions met with vesicles on the surface of the lungs—owing to the presence of air underneath the pleura, and the consequent elevation of the membrane—which were not influenced by inflation nor removable by pression; nor would the air they contained support combustion. These were, none of them, cases of broken-wind, nor was there any interlobular emphysema present. How, then, are we to account for the existence of these sub-pleural vesicles? In reference to man, Laennec explains their offspring by finding them to be dilated air-cells protruding: "that this is the case," he says, "is proved by the circumstance that we cannot force the contained air by pressure of the finger to leave its place." Whether such cases as the following are of this description, I must leave to be determined. Dr. Baillie thought that the air within them was secreted.

THE FIRST CASE in which I perceived these surface or pleural vesicles, was that of a bay horse who had, during a run with the Surrey fox-hounds on the 9th Nov. 1822, been over-ridden by his master, the late celebrated Captain Harvey, of Eltham, from which, on the fifth day afterwards, he died. The cavity of the pericardium contained a pint of fluid. The right lobe of the lungs was sprinkled with large, white, soft tubercles, was of a pink colour, and presented several large bladders of air, which raised the pleura from the surface.

THE SECOND was a horse admitted into the infirmary of the Ordnance at Woolwich, on the 5th February 1823, with symptoms of disordered bowels. His malady was never made out. He died on the 1st of June succeeding. The liver proved the chief seat of disease. Twenty ounces of water were found in the pericardium. One lung was remarkably pale—quite bleached in appearance; the other had its usual healthy aspect. *Both right and left lungs presented several bladders of air upon their surface, two or three of which were as large as apples cut in halves.* The pleura of the vesicles was cleanly and completely detached by air from the lung; the connecting cellular membrane having been absorbed. *The integrity of the lung in these places appeared to be unimpaired.* Inflation of the lung to extreme distention produced no visible alteration in the vesicles, although the experiment was several times repeated.

* The best method of demonstration in these cases is to dry the lung; previous to which, if requisite, it may be inflated.

One circumstance alone appeared to render it probable that the air might have come from the lungs, and that was, that, by pression, the vesicles could be rendered lax, although no air escaped externally.

Now, although these might have been cases of emphysema, certainly the interlobular extravasation was not present, neither were the subjects themselves broken-winded.

THE INTERLOBULAR OR TRUE EMPHYSEMA, Dr. Townsend informs us, " may be easily recognized in the dead body, by the transparency of the interlobular partitions, which contrast strongly with the dense structure of the intervening portions of parenchyma. Instead of the scarcely perceptible thinness which they exhibit in the natural state, these partitions, in a state of emphysema, are distended to the breadth of two or three lines, or even of an inch in some cases. They are generally widest at the surface of the lung, where the distention of their delicate cells bears an apt resemblance to a string of glass beads."—" When the disease continues to extend, the air passes from one interlobular partition to another, until it reaches the root of the lung, from whence it soon extends to the mediastinum, and thence spreads all over the trunk."—" Sometimes the air escapes into the cellular tissue which connects the pleura to the lung; forming bubbles of air, which may be pushed along the surface by the finger; by which circumstance they may be distinguished from the vesicles that are formed in *true* ? pulmonary emphysema, as the latter are prevented from being displaced in this way by their interlobular partitions. Laennec explains this extravasation of air as dependent on rupture of air-cells: in most extensive cases of this disease, however, no such rupture has been detected; and rupture of cells constantly takes place without a particle of air getting into these partitions." This is the form of emphysema which we must continue to regard as inseparably connected with broken-wind: we have no fact before us to shew that this has ever been observed in any but a broken-winded horse; although we have evidence sufficient to prove that symptoms of broken-wind may exist, and yet the lungs be sound and free from emphysema. Still, with Delafond, perhaps, shall we be justified in coming to the conclusion that, in three cases out of four, emphysema is to be found. And with this, let it be observed, it is very common to meet with thick-

ening, or otherwise altered condition, of the membrane lining the air-passages. Indeed, Laennec has ingeniously shewn how these morbid states are connected ; an explanation which has been adopted by Delafond, though condemned by D'Arboval on account of broken-wind being proved to proceed from other causes.

ASTHMA AND BROKEN-WIND have been compared, some regarding them as bearing "a close resemblance," while others maintain their identity cannot be established. It would be an easy matter to prove both parties either right or wrong, or, under varying circumstances, both right and wrong. The two disorders resemble each other in the circumstance of their proximate causes not being always the same; but they will be found very unlike in their symptoms and effects when their proximate causes are dissimilar ; and yet extremely alike when those causes are identical, as the following account, extracted from Martinet's Pathology, will shew :—

EMPHYSEMA OF THE LUNGS (ASTHMA) is characterized by habitual dyspnœa, recurring by fits, which are exceedingly irregular in their periods of return and duration, and are subject to be increased by any cause, however slight, that affects the respiration. The movements of the thorax are irregular, and habitually unequal; *inspiration is short, high, and rapid; but expiration is slow, incomplete, and as it were graduated: there is thus a manifest difference in the duration of the two movements.* During the fits the respiration becomes convulsive. On percussion the chest emits a sound more clear than in the healthy state ; but this unnatural resonance is not given equally at all points, as the disease seldom extends to the whole lung. When the affection occurs at both sides, we experience much difficulty in estimating this increase of sound, as we have then no subject of comparison ; and again, when only one side is affected, there is another source of error : we may mistake the sound side, as being less sonorous, for the diseased one ; but this is soon rectified by auscultation."

"*There is a constant cough returning in fits, usually dry, or accompanied by a viscid, transparent expectoration.* When the emphysema is of long standing and extensive, the intercostal spaces become expanded, and the thorax is rendered prominent, and rounded on one or both sides, according as the affection is single or double."

"In all the points occupied by the emphysema the murmur of respiration is very weak, or altogether suppressed. During full inspirations, and sometimes during expiration, we have a '*râle sibilant*,' resembling the sound of a small valve, or a '*râle sonore*,' imitating the cooing of a dove. The contrast between this marked resonance of the thorax, with the feebleness or total absence of the respiratory murmur, constitutes the distinctive character of this disease."

Surely, these remarks are not only applicable, but cannot fail to prove of very great service to us in our examinations of cases of broken-wind, supposed to consist in emphysematous lungs.

ARE THERE OTHER PROXIMATE CAUSES OF BROKEN-WIND? We are hardly advanced enough in our inquiry to answer this question. French authorities give us *nervous influence*, *pulmonary inflammations*, *lesions of the heart*, and *lesions of the diaphragm*.

PROFESSOR SEWELL is of opinion that broken-wind consists in structural or functional derangement, and consequent loss of power, of the muscular fibres traversing the trachea and encircling the bronchial tubes, in some portion or the whole of their course.

PROFESSOR DICK, in company with Mr. Hallen, V.S. 6th Dragoons, examined a mare after death that had for years been affected with broken-wind, and could discover *no apparent lesion* that could by possibility bear on the complaint. Was this nervous broken-wind?

THE DEVELOPMENT OF BROKEN-WIND, in what cases I have seen, has been gradual, and has been preceded, in general for a long time, by cough, which, from its resemblance to the one characteristic of the disorder, has received the distinctive appellation of *broken-winded cough*. By this I do not desire to have it understood that cough is the cause of broken-wind; but that there is a kind of cough of which it is the invariable termination. It is natural to suppose there must be some connexion between this cough and the altered condition in which we so commonly find the membrane lining the air-passages, though there may be other causes for it. According to the doctrines of the late Professor Coleman, it is " exertion on a full stomach " that produces broken-wind. Racers, post and coach-horses, and troop-horses, he used to adduce as instances of rarely being broken-winded, because they are fed and watered in that systematic manner that never compels them to work with distended stomachs: on the other hand, horses irregularly fed and worked, and such in particular as consume a great deal of hay—clover hay and chaff—as farmers' and millers' horses, are the most frequent subjects of the disorder. This accords with what is observed in human kind. Dr. Townsend informs us that, " the great majority of cases (of interlobular emphysema) seem to result from

some sudden and violent effort of the respiratory muscles, as in the forcing pains of child-birth, in raising heavy weights, in hooping-cough, &c." For the most part, broken-wind affects aged horses: rarely do we see it in young ones. D'Arboval says, he never met with a case prior to the sixth year of age; and believes that mares are more disposed to it than horses. The following is a case of its occurrence early in life, as well as of its progressive development:—

A gelding was passed by me at three years old, for the regiment, as sound in every respect. The second winter afterwards he experienced an attack of chronic bronchitis, a prominent symptom of which was, cough, which proved obstinate, and remained after all the other symptoms had disappeared. Although considered "cured," he was not suffered to do any work in consequence of the cough hanging about him. In the ensuing spring, during the blowing of a keen easterly wind, the cough became increased to that degree, that I again submitted him to medical treatment. After a time I perceived there was some agitation of the flanks, not of a character to denote any thing like pneumonia, but such as evidently portended the approach of broken-wind. And what appeared to confirm this prognosis was, that his appetite and spirits continued undiminished, although his cough, which came on by fits, was now of that violent and convulsive character that it almost choked him, and withal so loud that it could be heard at a very considerable distance. By degrees, however, after a time, it became both less loud and less troublesome; and in the end degenerated into the feeble, short, husky cough of broken-wind; in which disease, at the expiration of a month from the commencement of the second attack, the case terminated. Ultimately, the horse was cast and sold.

SYMPTOMS.—There are two which in an especial manner characterize the disorder, and render it manifest to any person who has once paid attention to them; viz. the *respiration* and the *cough*. Expiration is an act difficult and protracted; inspiration, one facile and quick. Watch a broken-winded horse breathing. You will see the flank and posterior ribs, after being drawn up, fall all on a sudden, and with the belly expand; but this act of expansion—inspiration—will be cut short by the subsidence of the parts once more; and that act of subsidence—expiration—will be followed up by one of contraction, by which the flanks and ribs will be drawn up again to their utmost. So that expiration is, in fact, a double action; the effect—as Mr. Blaine has happily ex-

plained it—of the muscular powers being called to the aid of the elastic or ordinary expiratory agents. The French have designated this peculiar flank-movement by the fantastical names of *coup de fouet*, *double tems*, *contre tems*, *soubresaut*: we might fairly call it *jerking respiration*. Considering the lungs to be emphysematous—of which both D'Arboval and Delafond admit this kind of breathing to be pathognomonic—these phenomena admit of ready pathological solution. The extravasated air is tardily and with difficulty forced back into its proper channels; to effect it, the lungs require additional and even supplementary compression: but, when once this has been accomplished, fresh air really *rushes* in to occupy the vacuum, larger than ordinary, which is created by the dilatation of the chest. *The cough* is more than short; it is half suppressed or chopped off, as it were; and so feeble, that at any distance it is hardly audible: frequently, it is followed by a wheezing sound in the throat, and then puts one in mind of an asthmatic man. At the beginning of the disorder—and indeed on certain occasions afterwards—it is apt to be very troublesome; to come on in fits, particularly during exercise, or after drinking.—*Indigestion*, also, is a prominent symptom. The horse has a voracious appetite, and yet is in lean condition. And well he may be; for if we examine his dung we shall find it looking like so much chopped hay, mingled with oats and husks, altogether evincing a most imperfect digestion. Out of this likewise arises that remarkable *flatulence* of bowel which is the occasion of the tumid, tense, tympanitic belly, frequently pendent from weakness, and which is, moreover, often so annoying in another way—one from whence, as I said before, the disorder appears to have derived its name. When the horse is first taken out of his stable and put to exercise or work, the ejection of wind, simultaneous with every effort he makes, or even with his cough, together with the occasional voidance of fæces, is in some cases perfectly disgusting: it, however, affords him relief in his breathing, by making room for the recession of the diaphragm, and to the degree that, after he has once “emptied himself,” he will work on with very little inconvenience to himself or annoyance to his master.—*The skin* also indicates the failure of the digestive powers: it becomes

harsh and dry, perhaps hidebound; the coat likewise grows long and rough, and pen-feathered: all adding to the generally unhealthy aspect of the animal.—“When one lung only is emphysematous, or is much more emphysematous than the other, the intercostal spaces become wider, and it yields a clearer sound on percussion. If both sides are affected equally, the whole chest yields a very distinct sound, and exhibits a round globular outline, swelling out on both sides; and this conformation is so remarkable as to render the existence of emphysema evident from simple inspection*.” Will this observation, concerning the altered form of the chest, not apply to horses?

CHANGES OF WEATHER have some such effect on the broken-winded horse as they have on the human asthmatic. During the fogs of autumn and the dry easterly winds of spring, and even in sultry summer weather, the animal's breathing is apt to be more disturbed, and his cough to be more troublesome, than at other times. I have seen broken-winded horses panting for breath in their stables under exacerbations of this kind; when, at another time, their respiration has been so tranquil, that, unless our attention had been drawn in an especial manner to them, we should hardly have suspected they were so disordered. Catching cold—the supervention of catarrhal disorder—will also induce an exacerbation.

AFTER THE FULLEST INVESTIGATION of the subject practically, and after consulting all the best veterinary authorities, both British and Continental, I must confess myself forced to come to the conclusion, to counsel my reader still to adhere to the doctrine, that emphysema of the lung is the pathology of true broken-wind, and that the emphysema is of the *interlobular* description. To what extent horses are liable to that spurious form of emphysema, called *vesicular*, which consists in *dilatation* only of the air-cells, and how far the same may tend to induce broken-wind, I am not at present, myself, prepared definitively to say: I can only repeat, that Delafond includes both kinds of emphysema in his proximate causes of the disorder. That gross and irregular feeding, violent exercise on a full stomach, and chronic bronchial affections, are the common

* Townsend's account of Emphysema in Man.

fore-runners and producers of this emphysematous condition of lung, there can be no doubt; and I look upon Laennec's explanation*—since adopted by Delafond—of the manner in which bronchitis leads to emphysema, although it is ridiculed by D'Arboval, as the most plausible theory we yet have on the subject. I also believe that the indigestion, so common an attendant on the disorder, may *precede* it and prove the occasion of it. In regard to broken-wind arising from other causes, that a disorder analogous to it—perhaps indistinguishable from it—does on occasions present itself, no one acquainted with the subject any longer entertains a doubt about; but, after all, this may not turn out to be what we have been in the habit of regarding as broken-wind: there may and will not, I apprehend, be found to be in its origin, course, and termination, *precisely* the same series of phenomena; notwithstanding, I repeat, the symptoms may be so similar, that, by our ordinary tests of observation, we fail to make out any difference between them. The time seems fast approaching when we shall be enabled to diagnosticate in the living animal between emphysema of the lungs and rupture of the diaphragm, and other lesions whose symptoms simulate those of broken-wind; and then—but not till then—shall we all come to an unanimous opinion touching its pathology.

BY PERCUSSION AND AUSCULTATION we may, probably, be enabled to achieve this great desideratum. According to Delafond, "The pathognomonic signs of pulmonary emphysema are, 1st, The interrupted respiration; weak respiratory murmur; loud resonance of the thoracic parietes; rubbing sound; sibilous and crepitous râles. 2dly, The simultaneous existence of all these symptoms in many parts of the lung indicates general vesicular dilatation and inter-lobular emphysema. 3dly, Weak respiratory murmur during expiration, rubbing sound during inspiration, anormal resonance of both sides of the chest, are more especially the signs of simple vesicular dilatation confined to the anterior lobes, or of dilatation throughout the pulmonary tissue. 4thly, The dry crepitous and dry sibilous râles, deeply interrupted respiration, very loud resonance, and extreme dyspnœa during exercise, are the especial indications of interlobular emphysema. 5thly

* Given at page 127.

and lastly, The presence of dry crepitous râle and loud resonance, located in one or more parts of the lung, announce local vesicular dilatation in those places."

TREATMENT.—No disease more completely evinces the revolution science has effected in veterinary medicine than broken-wind. Our professional forefathers, mistaking the effect for the cause, conceived the disorder to consist in distention of the bowels with air, and thought that, by affording additional facility for the emission of this, they cured or palliated the complaint. Accordingly, what did they do?—nothing less than absolutely make an artificial anus for the more free escape of this redundancy of wind. In the operation the sphincter ani sometimes got divided; and the poor animal, unable to close his fundament, became ever afterwards a most loathsome spectacle, and but too convincing and disgusting a proof of the ignorance and barbarity of his medical attendant.

Broken-wind is in itself an incurable disorder. Notwithstanding, it is one whose effects in most cases admit of palliation, and generally in two ways:—either by administering to the complaint itself, or by putting the bowels into that state most favourable to the animal's breathing. I shall therefore consider the treatment under two heads,—*medical* and *dietetic*.

MEDICAL TREATMENT will be required at such times as the symptoms are much aggravated by any concomitant catarrhal or febrile affection. Blood-letting to a small amount may be advisable. In cases where there is more local than general irritation, and when the animal cannot afford to lose much blood, we may try what the French veterinarians recommend,—opening the spur-vein. Aperient medicine—small doses of aloes and *enemata*, always prove serviceable. Should there be any flux from the nose, encourage it by steaming the nostrils, providing the animal can bear it without becoming harassed in his breathing. After the bowels have been opened, I would administer some sedative. Digitalis has been found effective in temporarily quieting the respiration: indeed, so tranquil does the breathing become in some cases under its influence, that the horse appears as though he had got quite rid of his disorder. With the cessation of action of the remedy, however, his

symptoms all return. The French give opium with the same intention.

DIETETIC.—Solleysel is said to have cured a broken-winded horse by confining him for eight days in a barn with plenty of hay, but without water or drink of any kind. In modern times, these experiments have been repeated by Rodet.

He shut up a sound constitutioned glandered horse, who had become broken-winded, and gave him hay only, depriving him of all drink. He was fat in condition, winter-coated, and his pulse was 36, and inspirations twelve a minute. The first three days he did not appear to suffer much, notwithstanding that he became hollow in the flanks, and tucked up. The fourth day he sought everywhere for water, licked the hands and clothes of his attendants, gaped often, and was unusually lively. Though the pulse and respiration remained unaffected, the animal began to fall away and his coat to come off. On the fifth day, whenever he moved his joints cracked, a symptom which continued increasing afterwards. His flanks were now quite drawn up; his appetite failed him, the pulse continued 36, but the inspirations sunk as low as eight a minute. The mucous membranes were reddened and injected, and there was a flux from the left nostril which continued augmenting to the last; but there was a strange diminution in the swollen gland, and which became afterwards still more striking. On the sixth day, still losing flesh. Eighth day, the gland ceased to diminish; the horse dejected, and looking thinner; was very weak, had left off eating, and no longer lay down; nasal flux abundant, and sticking about the nostrils. Tenth day, six inspirations and thirty-six pulsations a minute. The horse staggered in walking, and refused to eat. Seeing that he could not in this state long survive, water was brought. He drank, and immediately recovered his appetite. He regained his *embonpoint* with the same rapidity with which he had lost it. For some days afterwards the nasal flux had much diminished, together with the inflammatory action, and the movements of the flanks had lost their *soubresaut*. But in four days more, all the symptoms of broken-wind had returned. The horse was destroyed, and his lungs shewed general emphysema.

By PROPER FEEDING, and *by condition*, it is that we render our broken-winded servant, while free from exacerbation, of the greatest service to us. By a judicious plan of regimen in respect to exercise or work, and feeding and grooming, the animal must be got into the best possible condition. All his grossness, all redundant fat about his body and bowels, must be got rid of, so that nothing remains but sheer hard muscle; and when this—which is

condition—shall be attained, the horse—be he broken-winded, or roarer, or otherwise defective in his “pipes”—will do his work with so much comparative facility and comfort, that he will no longer appear like the same animal. His food should be of that kind which will not greatly distend his bowels or be hard of digestion, or prove astringent in effect; at the same time it must be nutritive, and such as he can work upon. Take care that he does not fill his stomach, and that he gets not water enough to load his bowels, just before he is required for work; but only sufficient water and food to maintain his stamina, and these given some two, or three, or four hours before his work is likely to commence. The object of all this is, that his respiratory powers—above all, his *diaphragm*—may play as unencumbered as possible, while at the same time his body is lightened and his stamina strengthened. Give him a peck and a half of oats a-day, and not more than six or eight pounds of hay, and that of the best upland quality—no clover, nor sainfoin, nor lucern, nor, in fact, any gross and filling rack-meat—and let him have his hay *after* he has done his work, and, for the most part, his water too. It has often been remarked how well broken-winded horses work when fed on green food, even of almost any description—vetches, clover, lucern, &c.; which at first appears like a paradox to the above: but, no!—this arises from the easily digestible and laxative properties of the recent vegetable, insomuch that it remains but a short time within the stomach, and is, during any bodily exertion, speedily ejected from the bowels. It must be borne in mind, however, that green food would not be admissible to a horse required to be kept in hard condition. To horses much troubled with flatulence, and who, from the appearance and offensiveness of their dung, are evidently the subjects of indigestion, I know of no food that in general seems so suitable as carrots: other roots—such as Swedish and common turnips, potatoes, and mangel wurzel—may likewise be given, and it will be found, I have understood, a great improvement to boil or steam them first. Finally, let the pace be slow and moderate at the beginning: by degrees it may be increased, and in this manner the animal’s fullest powers called forth.

NIMROD informs us, that, in the stables of the fast coaches, horses are only allowed half a truss of hay each for seven days,—then they get a bushel and a half of corn, each, besides;—and that a broken-winded horse is now scarcely heard of among them. “I have taken some pains,” continues Nimrod, “to ascertain this fact by my own personal inquiries. One proprietor, who has nearly fifty horses at work—many of which are in as fast coaches as any that travel on the road—assured me, lately, that he had not a broken-winded horse in his yard; whereas, before he stinted them in their hay, he generally had *one in five* in that state.”

WHY CANNOT WE CURE BROKEN-WIND? This question is extremely likely to be put to us—and by some *surgeon*; for Laennec says, interlobular emphysema is curable—he has seen “several recoveries from it.” And Dr. Budd, who presented a paper last year to the Medico-Chirurgical Society on *Vesicular Emphysema*, says, in regard to the *interlobular*, that it is the result of an accident—rupture of the air-cells—most commonly caused by deep and rapid inspiration, “and which is, generally, a *very trifling injury*.” And, again, Dr. Townsend’s words on the same part of our subject are—“fortunately, however, the diagnosis is not a matter of much practical importance, as in slighter cases (in which alone any ambiguity can exist) *the air appears to be always absorbed, and the interlobular partitions gradually return to their natural state.*”

There surely must be some mistake about this lesion. Either we must be terribly out in our pathology, or these medical philosophers must be in error. The difference of the animals certainly never can make this difference in results, the causes being admitted to be similar. We have no notion of the “absorption of air,” and “the parts gradually returning to their natural state.” With us it is, once broken-winded, for ever broken-winded. Delafond, indeed, speaks of the *possibility* of cicatrization of the torn air-cells, in cases where they have been ruptured by violence, by rest and depletive measures; but he adduces no fact or case to make us believe it possible.

SPASM OF THE DIAPHRAGM.

If I mistake not, our attention was first called to this subject by the celebrated Nimrod, Mr. Apperley. In his admirable "*Letters on Condition*," so long ago as the year 1825, he remarks, while on the subject of treatment of a hard and long run,—“When a horse is very much exhausted after a long race with hounds, a noise will sometimes be heard to proceed from his inside, which is often erroneously supposed to be the beating of his heart, *whereas it proceeds from the excessive motion of the abdominal muscles.*” This interpretation of the “noise” was shortly afterwards disputed by Mr. Smith, of Woodhouse, who ascribed it *to the heart*. In a subsequent letter, however, Mr. Apperley, having in the interval met with another case, argues that the noise from the situation in which it is heard cannot possibly proceed from the heart, unless, indeed, as he adds, “the heart lay where it should not lie;” but—repeating his former opinion—it is caused by “a convulsive action of the abdominal muscles.”

In 1831, Mr. Castley, with his mind directed to the subject by the foregoing observations of Mr. Apperley, sent a paper to “*The Veterinarian*,” wherein, although he had never seen but one “well-marked instance of it,” he appears to have hit upon the true explanation of the phenomenon; which is, that the “noise in the inside” is owing to “spasmodic affection of the diaphragm.” In

MR. CASTLEY’S CASE, the prominent symptom was “a convulsive motion or jerking of the whole body, accompanied by a dull thumping noise, audible at several yards’ distance, and evidently proceeding from his inside. The beats appeared to be about forty a minute. On placing my hand over the heart, the action of that organ could be felt but very indistinctly: the beating evidently came from *behind* the heart, and was plainly to be felt in the direction of the diaphragm. Again, placing my hand upon the abdominal muscles, the jerks appeared to come from before backwards. There was no pulsation to be felt at the submaxillary artery.”

MR. BROWN, V.S., Melton Mowbray, in 1833, published three “well-marked cases” of it. The first was that of a young mare taken up from grass and driven slowly thirty-five miles in one day, with a stomach filled with three pecks of oats. The second, that of a horse who “had been living in a state of rest for some time, and was forced to sudden and violent exertion with his stomach full of grass.” The third had not undergone any exertion,

save that of "rolling and pawing" from an attack of gripes. Mr. Brown referred them all to "spasmodic action of the diaphragm."

To Mr. SINCLAIR*, V.S., Morpeth, spasms of the diaphragm occurred in a case of trismus. "There was a loud beating in the region of the diaphragm, which could be heard at a distance of ten yards, and not synchronous with the pulse. It was "accompanied with distressing cough and profuse perspiration." The case did well, treated by opium and digitalis, and keeping the bowels open.

Mr. TOMBS†, V.S., Pershore, saw a five-year-old mare, who for some days had been out at grass, and became suddenly seized with quick and laborious respiration, quick pulse, and shivering, which were treated by venesection and an aperient. "In the evening violent palpitations of the diaphragm came on, which was discovered by a tremendous and loud noise inside the ribs, as though a man was in the thorax beating the ribs with a hammer: the noise proceeded principally from the left side, midway between the spine of the back and the ninth rib. Pulse almost imperceptible." Venesection and opium, and stimulating liniment to the side and extremities, with aperients, perfectly cured the case.

Mr. GUTTERIDGE‡, V.S., Carmarthen, was called to a mare who, on her arrival in the Gloucester mail, shewed great uneasiness, frequently attempting to stale; pulse 90; "and there was a violent beating on the near side, which could be heard at a considerable distance. Her side was much convulsed; and, on placing my hand over her heart, its action could not be clearly felt." Venesection—which it became necessary to repeat—aperient medicines and opiates, recovered her.

THE SYMPTOMS, collected from the foregoing cases, are—violent palpitations against the ribs, loud enough to be heard at a distance of some yards, producing a convulsive motion or jerking of the whole body, and unconnected with the pulsation of the heart, being posterior to that organ, in the region of the diaphragm. Indeed, the pulse at the heart is rarely perceptible, nor is it often to be distinctly felt at the jaw. The horse is in great distress for breath. Now and then he breaks into a profuse sweat; and, in some cases, a harassing cough is an accompaniment.

CAUSES.—Over-fatigue or exhaustion, especially of the kind caused by hunting, or on a full stomach. In some instances it has come on at or after grass. In one case it proved an attendant on locked jaw.

PATHOLOGY.—That the seat of the disorder is the diaphragm,

* Veterinarian for 1835.

† Ibid, 1835.

‡ Ibid. 1836.

both its locality and symptoms appear to set beyond doubt; and that the affection is in its nature "spasmodic," I think is forcibly argued, as well from the character of the symptoms, as from the sudden manner in which it attacks and quits the patient. After all, however, it appears Mr. Apperley was not running into vast pathological error when he pronounced the disorder to be in the abdominal muscles. For, supposing the diaphragm to be in a state of spasm or convulsion, how could the breathing be carried on if it were not for "the excessive motion of the abdominal muscles?" Upon the action of the diaphragm, ordinary, undisturbed respiration almost entirely depends; and when this agent is incapacitated or deranged, but for those necessary and powerful auxiliaries—the abdominal muscles—the breathing must become suspended and the animal die. The "distress" of our patient is occasioned by this dread of suspension; "the jerkings of his body" by the efforts he is making with his abdominal supplementary powers to counteract it. We know that one of the common causes of spasm is over-action; we need, therefore, feel no surprise that spasm should seize the diaphragm after such labour as that muscle must have been performing during a severe run with hounds. Mr. Brown's and Mr. Tombs' cases shew that it may supervene upon colic, and certain states of the stomach and bowels produced by green diet. In conclusion, the spasm may be the effect of inflammation of the diaphragm.

THE TREATMENT to be pursued must be entirely regulated by the nature of the case. Should the case be one of the "over-marked" description, and there be signs of exhaustion or decline of the vital powers, we must give stimulants with our antispasmodics. Incomparably the best antispasmodic is opium; therefore give in this case, immediately, either the following ball or drench:—

Take of		Take of	
Opium.....	ʒi	Tincture of Opium.....	ʒi
Sub-carbonate of Ammonia.....	ʒiiss	Spirits of Nitric Æther.....	ʒij
Aniseed Powder.....	ʒiiss	Warm Water, or Gruel.....	Oj
Syrup of Ginger sufficient for a ball.		Mix, and make a drink.	

Even in such a case as this, after re-action appears to have taken place, should the spasm continue, blood-letting must be practised; but in a case of another kind, when the contrary to exhaustion is present, four or five or six quarts of blood should be drawn,

and the antispasmodic medicine—the opium—either with or without the ammonia and æther, given at the same time. Warm clysters should be resorted to; and, could it be had, a warm bath would be likely to afford great relief. Should the case appear to be anywise connected with colic, I would, above all medicines, give the gripe aperient drench, thus composed:—

Take of Decoction of Aloes (containing of Aloes ʒi).....	Oj
Tincture of Opium.....	ʒi
Spirits of Nitric Æther.....	ʒij

Mixed together.

This drench must not be repeated. But either the antispasmodic ball or drench be given a second or even a third time, if required, at intervals of three or four hours; care being taken to keep the bowels soluble by injections.

RUPTURE OF THE DIAPHRAGM.

It is not many years since this lesion was added to our nosology. For calling his attention to it, as well as for shewing its connexion, in similarity of symptoms at least, with broken-wind, I believe the veterinary surgeon to be indebted to an inestimable, now deceased, friend of mine, Mr. Thomas King, late surgeon at Barnstaple, with whom, while dressing for Mr. Travers at St. Thomas' Hospital, I had the good fortune to become most intimately associated. Shortly after leaving the Hospital for private practice—having while there, as it would appear, from his acquaintance with me, imbibed a taste and liking for veterinary pursuits—Mr. King sent me, I think it was in the year 1825, the following communication, which I, three years afterwards, published in one of the earliest Numbers* of *THE VETERINARIAN*: in fact, almost immediately after I had originated that Journal.

“A little mare of my father's was many years since ridden rather sharply for half a dozen miles. This was in summer; consequently she was in all probability full of grass. Be that as it may, she soon after exhibited the symptoms of broken-wind. At length, she died rather suddenly, whilst standing in the stable. I ought to have mentioned that the cough was the most curious apology for a cough you ever heard: it resembled nothing so much as the short breathing of a child under pulmonary inflammation. On examination, it was

* In vol. i, page 101.

found that the diaphragm was lacerated on the left side through its whole extent, throwing the two cavities into one. The laceration appeared recent; but I should think it must have been in part old: what should you say? The lungs were dark-coloured and collapsed; the edge of each lobe to such a degree, that those parts were not inflatable, though air could be made to pass when they were cut through. No air underneath the pleura pulmonalis. Heart and large vessels quite healthy. Posterior surface of the diaphragm on the left side shewed signs of former inflammation: its peritoneal covering had become altered in structure, and was here and there studded with coagulable lymph. The examination was made by my father*. I wrote him a long list of observations on the case; but I shall not send you any until I have heard what you have to say: so remit me your thoughts on the subject."

In the same volume will be found three other cases, all furnished by that ever observant and communicative practitioner, Mr. Cartwright: before I notice these, however, I must give the particulars of one that occurred to Mr. Hayes, V.S., Rochdale, which—though curious altogether—possesses some characters corroboratory of the suggestions prompted by Mr. King's case.

A horse experienced an attack while at grass partaking of the nature of jaundice, which was subdued by blood-letting and aperient and sedative medicine. Being recovered, he was ridden for a week, and then turned to grass again, in the month of August. Nine days afterwards, the animal's services being again required, he was taken up and found broken-winded. Notwithstanding this he was ridden for three weeks more, and then again was taken ill with "marked anomalous symptoms of pleuritis and enteritis." In five days he was again quite recovered, and was once more ridden. His owner, however, by the advice of a blacksmith, now gave him an ounce of saltpetre night and morning to cure his broken-wind. This produced acute inflammation of the neck of the bladder, of which he died. On examining him, the lungs appeared sound. A portion of cæcum had protruded through a rupture in the diaphragm; forming a pouch within the chest, which had also become ruptured, and suffered its contents to escape within the thoracic cavity. The rupture in the diaphragm was near its inferior part, about five inches above the middle of the sternum; and was two-and-a-half inches in extent, with its edges sloughed off—quite smooth and circular. The liver was gangrenous. All the guts highly inflamed. The stomach almost black. The bladder and its neck, and urethra, all gangrenous. Small calculi within the neck of the bladder. Notwithstanding all this disease of the viscera, the horse continued to eat during the intervals of cessation from pain, which lasted about ten minutes

* Who is also a surgeon.

each time; though these were followed by fits of extreme agony of half an hour's duration and upwards.

The nature of Mr. Cartwright's cases may be gathered from the observations he has appended to them, which run as follow:—

"The mare—the first case—had been most severely worked for the last four or five months, and latterly whilst labouring under considerable catarrh. Her owner was in the habit of knocking and kicking his horses about, and driving occasionally at a greater rate than their strength would admit, and it is probable that her rib—which after death was found fractured—was broken by ill-usage, and that peritonitis was brought on by her being kicked in the abdomen. Over-exertion and her excessive coughing caused partial rupture of the diaphragm, which was completed the day she was exercised, or soon after."

"The second case I attribute to excessive and repeated coughing; for the fibres of the diaphragm in each case seemed as if they were drawn from each other, being tapered out at their edges to the mere thickness of a wafer."

To these two cases Mr. Cartwright adds a third, in which rupture of the diaphragm appeared to have been caused by parturition occurring in a broken-winded mare, while at pasture, and at a time that her bowels were distended with green food and flatus.

THE NEXT COMMUNICATION on the subject issued from the pen of Mr. Hales, V.S., Oswestry; and it will be found a valuable one, not only for the sensible remarks by which it is accompanied, but on account of its teaching us a new fact—that it is possible for the diaphragm to become "extensively and fatally ruptured by its own vehement muscular contractions, in a horse previously in perfect health."

During the unparalleled hot weather of July 1825, a four-year-old mare was put to a carriage, with three others, to go, post, from Oswestry to Shrewsbury—eighteen miles. In general she was led in hand; but this day one of the postilions—about twelve stone—rode her, and they went a quick pace. After doing this, she was put to work another carriage back to Oswestry. She reached within a mile and a half of her journey's end, and then became so much distressed, that she was taken out of harness, and with difficulty got to her stable. Mr. O. being from home, an hour elapsed before he saw her. "She was breathing with great difficulty—not in that short quick way that characterizes inflammation of the lungs, but each respiration was produced with great effort, like a person labouring under a severe fit of convulsive asthma." "I am free to confess"—continues Mr. O.—"that the peculiarity of the breathing both surprised and puzzled me, as I had never seen any thing like

it in the horse before, nor have I since; but knowing that the mare had undergone dreadful fatigue, it was set down as a case of exhaustion or *over-marking*, as sportsmen term it." In half-an-hour she died. There was a rent in the diaphragm, extending from the ensiform cartilage to the hole through its tendinous portion for the vena cava. The lungs and other viscera were sound. Neither stomach nor intestines were found loaded with food. Another practitioner of the town related a similar case to Mr. Hales.

MR. CARTWRIGHT MENTIONS A SIMILAR INSTANCE.—A coach-horse, twelve-years-old, dropped down dead, going at the rate of ten miles an hour. "The rupture (in the diaphragm) was so large that a man's head could easily pass through it, and was near the ensiform cartilage, extending as much on one side as on the other. It was the muscular part, and some part of the muscle seemed to be torn from the tendinous portion. It was evidently a recent affair, as there was not the least disease about it."

Pursuing our inquiries on this interesting and comparatively novel subject, we come to a case narrated by Mr. Price, V.S., Rochester :—

It was "a noble-chested cart-horse, aged, very free in his work, and the day never too long for him." He had continued working with a severe cough for a fortnight, his appetite being good; but at length was taken "seriously ill." A smith was then sent for, who took away five quarts of blood; and next day the same quantity. On the third day Mr. Price was called in, who "found respiration extremely laborious, and the animal shewing great uneasiness by incessantly moving about; pulse 50, and hard." Next morning the pulse was 90, and soft; and the respiration still more difficult, which, observes Mr. P., "I should have thought impossible, had I not seen it: the animal considerably tucked up in the flanks, and shewing altogether great distress." Mr. P. bled: the blood was "very dark, and without any separation of its constituent parts." The horse died on the seventh day. The diaphragm was found "ruptured on the near side, as large as a crown-piece: its anterior surface presented one mass of inflammation, and might be considered in a gangrenous state. It was so rotten, that it came off in bits between the finger and thumb. The lungs were perfectly collapsed, but otherwise healthy;" as were likewise all the abdominal viscera.

THE THROES OCCASIONED BY DIFFICULT PARTURITION may end in rupture of the diaphragm. Mr. Thomson relates a case of this description*, in which the muscle was discovered "ruptured almost from side to side, *across* its fibres."

RUPTURE OF THE DIAPHRAGM AFTER DEATH.—On French authority† I am now going to report two cases which would appear

* *VETERINARIAN* for 1835.

† Report of the Proceedings of the Royal Veterinary School at Lyons, during 1831.

to establish this among other facts connected with our present investigation.

A coach-horse ran his chest against the pole of a carriage; fractured two of his ribs, and opened the intercostal arteries, from which blood poured into the correspondent side: death ensued twelve hours afterwards. He did not manifest after the accident, or, indeed, had he at any previous time shewn, any thing symptomatic of ruptured diaphragm. His carcass was examined fifteen hours after death. The belly was then exceedingly distended. The diaphragm was found ruptured on the right side through its upper part, not far from its tendon; the laceration was very irregular, and measured four inches in length. The arch of the colon completely closed the breach. The fibres of the muscles were corrugated and collected into parcels. The colour of the lacerated fibres was the same as the rest of the muscle—a livid death-like hue; their edges were nowise tumefied. Not a streak of blood appeared upon them, nor was a drop effused into the abdomen.

An adroit and experienced horse-gelder had a young horse die suddenly after the removal of the first testicle. He sent to the Lyons Veterinary School for assistance, and some pupils went and examined the carcass. Although the horse had been dead but twelve hours, the belly was found exceedingly distended. They found the stomach ruptured towards its left curvature, and the diaphragm lacerated through the fleshy part of its right side. The diaphragmatic lesion had given vent to no hemorrhage, nor were the lacerated edges at all tumid. The divided fibres were irregular, collected into unequal parcels, and their colour the same as that of the other parts.

I leave these cases to the consideration of my reader and the test of future observation: whether they be or be not proofs sufficient of the fact they are intended to demonstrate, they have at least this value,—they will serve to caution us against hasty and inconsiderate decisions on occasions when we meet with rupture of the diaphragm in the dead body and are not altogether satisfied about the symptoms during life.

THE DEDUCTIONS to be drawn from the foregoing and other analogous cases, are, that rupture of the diaphragm is by no means unlikely to follow acts of extraordinary exertion, efforts of any kind in fact, particularly upon a full stomach, or rather when the bowels are distended with green or other food likely to generate gas. A fast gallop, straining draught, a heavy fall or blow upon the side, violent fits of coughing, even the throes of parturition, have all proved the occasion of it. The diaphragm, in itself the principal respiratory agent, any act said to “break the wind”

of a horse seems quite as likely to produce laceration of it as rupture of the air-cells; a circumstance which, connected with the resemblance in the symptoms of the two lesions, will very well account for the cases of broken-wind reported to consist in ruptured diaphragm: though, in truth, they are not broken-wind, at least, not the disease which in our pathology answers to that name. While the whole body is in action or convulsed, the diaphragm, as D'Arboval has pertinently observed, becomes the *point d'appui* of the muscular system, in which state of contractile resistance its fibres must especially be liable to be rent. Coupled with these causes of rupture, we must not forget what has been known to happen—and what may often happen in such cases—after death, when, from *post-mortem* gaseous emissions, the bowels become distended and forced against the diaphragm and abdominal parietes to a degree to threaten bursting. I have seen the recti muscles split and torn in this manner, as well as the fasciculi of the diaphragm; and therefore, I repeat, it requires in this tympanitic state of the dead body, extreme caution in pronouncing upon such lesions.

SYMPTOMS.—Cases have occurred in which nothing has appeared to indicate disorder, and yet after death the diaphragm has been discovered, ruptured. Other cases have manifested such extraordinary agitation in the breathing, that the disease has appeared at once distinguished from all others. This incongruity, probably, is to be accounted for by the nature, direction, and extent of the lesion in the muscle. On occasions, the disorder has so resembled broken-wind that very good veterinarians have mistaken it for that disease: hence one reason for the discrepancy of opinion concerning the pathology of the latter. The respiration and cough must furnish us with the main clue to the lesion: and should symptoms of colic be present as well, we may suspect that some abdominal viscus—intestine or omentum, or even liver—has got into the rent in the diaphragm; and should it become strangulated there, it will give rise to symptoms such as indicate strangulated hernia elsewhere.

THE LESION or rupture in the diaphragm may occur either in its fleshy or tendinous portion: the former appears to have been the most frequent seat of it, and in particular in the vicinity of the

ensiform cartilage. In one case the muscle was split quite across. Tumefaction, reddening, infiltration of the lacerated edges indicate that the lesion is a recent one; absence of these signs, and smoothness and roundness of them, shew that it is of some considerable standing. Jagged, bloody, unchanged edges, with considerable distention of the abdominal viscera and parietes, and this having taken place in the interval between death and examination, will render it probable that the rupture has happened post-mortem.

THE RELATION TO BROKEN-WIND which this lesion bears, is of great importance to us—not that we have any power to remedy one more than the other, but—that we may be enabled to establish such a diagnosis between them as shall guard us from mistaking two pathological states so totally different from each other as rupture of the air-cells and rupture of the diaphragm. There can be no doubt but that they have been too often confounded, and hence one reason for the discrepancy of opinion concerning the nature of broken-wind. The principal diagnostics must be the respiration and cough; though every other collateral inquiry should be instituted likely to elucidate the case. Should colicky or hernial symptoms supervene, the nature of the case will admit of little doubt.

SECTION VIII.

DISEASES OF THE HEART, PERICARDIUM, AND GREAT BLOODVESSELS.

General Observations on the Action of the Heart.

PERICARDITIS	DILATATION
HYDROPS PERICARDII	OSSIFICATION OF THE HEART
CARDITIS	AIR IN THE HEART
INFLAMMATION OF THE LINING	RUPTURE OF THE HEART
OF THE HEART	ANEURISM OF THE AORTA
HYPERTROPHY	ANEURISM OF THE ILIAC ARTERY.

THE class of diseases we are now about to consider may be regarded as the least advanced of any of veterinary medicine; a circumstance not to be ascribed so much to their comparative rarity as to their existing undiscovered, or rather, being confounded during life with other disorders, and in particular with pulmonary affections, with which they will be found in practice often to be combined. Indeed, it is only within the present century that even surgeons have been able to boast of much knowledge in this branch of nosology. Antecedent to the time of Laennec, cardiac disorder in man was but seldom detected—if discovered at all—until that stage of the malady was passed when remedy might or could have proved effectual: to auscultation it is that surgeons stand principally indebted for enabling them to make out disease of the heart in its primary and incipient form; and to the same influential auxiliary must veterinary surgeons have recourse if they would aspire to any thing approaching the same perfection of art. In modern times, as an author who has taken great pains to investigate this subject, both by experiment and practice, stands eminently Dr. Hope*, whose labours have not only added to our previous stock of knowledge,

* The veterinarian will peruse with great advantage the Doctor's "Treatise on the Diseases of the Heart."

but have been attended with the important result of correcting errors concerning the action of the heart into which even Laennec had fallen, and which by his great authority had become extensively propagated and believed.

In order that we may be able to recognize and appreciate the sounds and sensations conveyed to the hand or ear by the action of the heart under disease, it will be necessary for us to make ourselves acquainted with those indications of its movements in a state of health, it being by comparison of the two that we shall best in the living body discriminate between the normal and anormal condition of the organ. By the hand applied flat against the ribs of the left side, immediately behind the elbow, the impulse of the heart is plainly enough felt, and its pulsations as easily numbered; but if the ear be applied, or a stethoscope used, two successive sounds, followed by an interval of silence, are heard. "The first motion," says Dr. Hope, "which interrupts the interval of repose, is the auricular systole. It is a very slight and brief contractile movement, more considerable in the auricular appendix than elsewhere, and propagated, with a rapid vermicular motion, towards the ventricle, in the systole of which it terminates rather by continuity of action than by two successive movements. The ventricular systole commences suddenly, and terminates in the diastole, which is marked by the second sound. Synchronous with the systole are, the first sound, the impulse of the apex against the ribs, and, in the vessels near the heart, the pulse; but, in vessels at some distance, as the radial (or submaxillary), the pulse follows at a barely appreciable interval."—"The *rhythm* of the heart, that is, the duration of the several parts of this series, which constitute what may be called *a beat*, is the same as described by Laennec: viz. 1. The ventricular systole occupies half the time, or thereabouts, of a whole beat. 2. The ventricular diastole occupies a fourth, or at most a third. 3. The interval of ventricular repose occupies a fourth, or rather less, during the latter half of which the auricular systole takes place."

This brief exposition, from Dr. Hope, of the action of the heart, will prepare us for that practical study of its movements in a state of health which it is absolutely necessary for us to institute before we

can take proper cognizance of those present under disease. Laennec directs this study to be conducted under four views or heads:—

1. The extent over which the actions of the heart can be heard. 2. The shock or impulse communicated. 3. The nature or intensity of the sound. 4. The order or rythm. In our examinations we must take care that the animal be in a state of perfect quietude, and entirely free from any suspicion or alarm concerning our presence or doings with him.

The extent to which the sound of the heart's action is audible will vary, even in health, according to the make and *embonpoint* of the subject under examination. In lean and narrow-chested horses it may be heard upon the right as well as upon the left side, and upon the latter over a large superficies: on the other hand, in such as are circular-chested and fat, the sound will be confined to the left side and to the spot directly opposite the heart. Exercise or agitation of any kind will augment the sphere of sound; and during those violent beats of the heart called palpitation, their influence will extend even beyond the chest, to other parts of the body. "By *hypertrophy*, the impulse is increased, but the sounds diminished."—"By *dilatation*, the impulse is diminished, often to the extent of being imperceptible." "By hypertrophy with dilatation, the contractions of the ventricles give a strong impulse"—"abrupt, dead, violent blows, which strongly repel the hand."*

The diseases of the heart and its appendages naturally range themselves into three classes:—those affecting the pericardium; those affecting the substance of the heart; and those affecting the lining membrane and valves of the heart and great bloodvessels.

PERICARDITIS.

THE pericardium is by no means infrequently the seat of inflammation. In opening horses that die of pleuritic disease, nothing is more common than to find effusions of lymph and water within the pericardiac cavity; as though the one membrane had morbidly sympathized with the other. "Redness alone," Dr. Hope says, "does

* For most valuable information on these points consult Laennec and Hope.

not afford conclusive evidence of pericarditis, as all serous as well as mucous membranes are liable to vascular injection from various causes independent of inflammation." The effused lymph is mostly disposed in layers upon the internal surface of the sac, and upon the exterior of the heart, giving additional substance to the one, and often a complete coating to the other, and, in some instances, forming adhesions between the two. In this manner, the pericardium may be increased in thickness to an enormous extent. The lymph assumes the same albuminous character as it does in the chest, and on being cut into, while recent, displays a honey-comb sort of texture, having its interstices loaded with a yellow serous fluid; in fact, putting on the same appearance, only that it is more concrete, as it does within the chest, and undergoing—should it remain—the same changes towards organization. In process of time, and when it exists as an additional lining to the pericardium, it grows close and firm, and attenuated in substance, and turns of a white colour. In one instance I found it converted into a substance of the nature of cartilage, about an eighth of an inch in thickness.

Pericarditis may assume either the *acute* or *chronic* type. It may exist as an idiopathic affection; but in most cases it will be found to be secondary—consecutive on pleuritic inflammation. That it may, at least in a chronic form, commence by itself and run its course alone, is in some measure proved by the cases of hydrops pericardii which every now and then present themselves unaccompanied by disease of other parts.

THE SYMPTOMS of pericarditis, I am afraid we must with D'Arboval admit, "have not yet been determined on." Even in man, with all the advantages surgeons possess in being orally informed of the pains and feelings of their patients, the diagnosis of pericarditis has always been considered extremely difficult and doubtful. "Dry cough; hurried respiration; palpitation of the heart, the impulse of which is sometimes violent, bounding and regular, though its beats may, at the same time, be unequal in strength; at other times it is feeble, fluttering and irregular; pulse always frequent, and generally, at the onset, full, hard, jerking, and often with a thrill." Such are the symptoms, applicable to the cases of horses, which Dr. Hope gives as characteristic in man; and such, proba-

bly, it will be wise in us to set before us in practice until from observations on our own part we shall be in a situation either to reject or confirm them.

MR. PRITCHARD, V.S., WOLVERHAMPTON, with laudable zeal for the promotion of our art, so long ago as the year 1833, furnished THE VETERINARIAN with some practical communications on this subject, which we shall find it advantageous to revive on the present occasion. His observations relate particularly to

HYDROPS PERICARDII,

Or that stage of pericarditis when effusion has taken place, and the membranous sac is supposed to contain both lymph and water.

THE SYMPTOMS of this affection, apart from pleurisy and pneumonia, Mr. Pritchard informs us, are "well marked." They are, "palpitation of the heart; the carotid arteries beat forcibly, and are readily recognized in applying the finger to their course in the neck. There is a good flow of blood through the jugulars, a copious return of blood through the neck, when the state of the pulse is considered; the surface of the body and extremities are warm, and these latter symptoms continue until within one or two hours of the horse's death." "In addition to the above symptoms, there is such an expression of alarm and anxiety in the countenance of the animal as no other malady produces."—"The respiration is but little disturbed."

THE FLUID COLLECTED in most cases resembles the serum of the blood. Sometimes it is red, from being tinged with exuded blood—at others, it is turbid from lymph floating in it—often it is sero-purulent in character, and looks like so much whey. Now and then we find pus in flakes mingled with it. In quantity it varies considerably—from a pint to a gallon or more. The horse generally sinks from other disease, or from constitutional irritation, before the cavity is filled. I recollect, however, the case of a cart-horse which occurred while I was a pupil at the Veterinary College, whose death, without any previous illness, took place most suddenly and unexpectedly, in whom the pericardiac sac was found distended

to that degree with water, that the heart had absolutely become undated and choked in its action.

THE PATHOLOGY of this dropsy, as far as our present investigations have gone, would appear to admit of various explication. Either inflammation or increased vascular action would produce it, and this commonly appears co-existent with disorder in the pleura; or it may be consentaneous with that dropsical diathesis of body under the constitutional influence of which all the serous membranes—those of the chest, pericardium, and abdomen, and head, too, perhaps—are pouring forth augmented secretion. Rarely, I believe, will this dropsy prove dependent upon disease or disorder of the pericardium alone.

CARDITIS.

INFLAMMATION of the muscular substance of the heart may be either general or partial; at least, this is the division made of it by Laennec, who nevertheless adds,—“There perhaps does not exist on record a satisfactory case of general inflammation of the heart, either acute or chronic:”—“unless, indeed, we choose to consider the word *inflammation* as synonymous with (discolouration or) *alteration* or *disease*.”—“Pus must be considered as the most unequivocal indication of inflammation.”

Veterinary records do not appear to furnish any such cases as would, according to the above definition, be regarded as carditis. Several Continental veterinarians have treated the subject in their works, with the usual routine of symptoms, causes, and treatment; but the perusal of their accounts turns out so unsatisfactory—most of them describing pericarditis for carditis—that I have not considered them of sufficient value to transcribe.

INFLAMMATION OF THE LINING OF THE HEART.

MR. Simpson, V.S., Southampton, relates a case in THE VETERINARIAN for 1834, in which this affection appeared after death extremely well marked.

The commencement was marked by symptoms of abdominal pain; next the respiration became greatly disturbed; and that was succeeded by a remarkable

change in the action of the heart (from simple frequency) to three or four beats in succession so violent as to shake the whole frame, and render its movements visible even at many yards' distance; with intervals of quietude of five minutes or more, the pulsation of the submaxillary unaffected all the while. Afterwards the violent beating became constant. Before death its force decreased, but never again down to the natural beat. *Autopsy*.—Both lungs inflamed. About a pint and a half of serum in the pericardium. Internal surface of the heart sound; lining membrane highly inflamed, "the left auricle and ventricle being covered with spots of ecchymosis, and the whole surface of the cavities on the right side being discoloured by inflammatory action."

HYPERTROPHY.

THIS is a term of comparatively recent introduction into medicine, to signify what in numerous instances we in former times expressed by the words *over-growth*, *enlargement*, &c. It is meant to denote an exuberance of growth, or augmentation of natural or normal volume. It would appear that almost any organ or tissue in the body may become hypertrophied or anormally augmented in volume and power, and yet preserve its functions sufficiently naturally performed not to occasion any alteration in the animal economy; of which the spleen is a remarkable instance: it is only when inconvenience is thereby produced that we look upon hypertrophy in the light of disease. On the present occasion, hypertrophy is used to denote an augmentation or thickening of the substance of the heart.

This occurs in one of three forms:—

1. SIMPLE HYPERTROPHY, or *hypertrophy without dilatation*, consisting simply in thickening of the walls of the heart, without any alteration in the dimensions of its cavity.
2. HYPERTROPHY WITH DILATATION, in which the walls are thickened and the cavity dilated.
3. HYPERTROPHY WITH CONTRACTION, in which the walls are thickened and the cavity diminished.

One or two or all four of the cavities of the heart may be hypertrophied. The entire heart has been known to acquire double its natural volume: a rare occurrence, however, but one which, when it does happen, is, according to D'Arboval, invariably referrible to emphysema. The ventricles oftener become hypertrophied than the

auricles, "because," says Dr. Hope, "they are exposed to a greater variety of exciting causes, and because the auricles are remarkably protected by the auriculo-ventricular valves."

THE SYMPTOMS of hypertrophy in horses are, I am afraid, but too little known to warrant any attempt at separate description of them. The following cases will prove our surest guides in practice. I believe the first ever published in this country emanated from

MR. PRITCHARD.—He was called to attend a three-parts bred six-year-old mare, employed in a posting establishment in Wolverhampton. "Her pulse was hard, with sufficient dilatation of the submaxillary artery; respiration laborious; membranes of the eye and nostrils vascular; surface of the body and extremities warm; off her feeding."—Mr. P. "listened to the heart; its contractions were powerful, loud, and regular; but the organ was evidently much oppressed." Notwithstanding active and judicious treatment adopted by Mr. P., the mare died, owing to his not being sent for earlier. On examination, in the pericardiac sac was found a small quantity of healthy fluid. "The right side of the heart was considerably enlarged, particularly the right ventricle, and without the softening of the walls. It was a fine specimen of hypertrophy of the right auricle and ventricle." The lungs were apparently too large for their cavities, which contained but little serous fluid. They were very heavy in hand, and, when cut into, were found, throughout, oedematous.

Mr. Thomson, V.S., Beith, N.B., published, a few months afterwards, the following case:—

In March 1833, Mr. T. had a horse belonging to Mr. Orr, Carse of Lochwinnoch, brought to him for examination. He was lame, apparently in the shoulder; he groaned when backed, and shewed unwillingness to turn round or even move. Pulse irregular and quickened. Mr. T., from the superficial examination he had, was inclined to regard it as a sort of rheumatism or founder. Venesection, purge—returned home. Mr. T. was summoned next day, and found him in the most pitiable condition,—standing with his fore legs wide extended; nostrils dilated; breathing quick and laborious; eyes sunken; pupils dilated; looking back and sighing; countenance hopeless. "Pulse had a most peculiar irregular motion, and the undulation of the jugular veins was extending up to the roots of the ears. He expired shortly afterwards. *Autopsy.*—Considerable inflammation of lungs, and pleura, and pericardium, the latter greatly distended with red fluid. The heart of enormous size, and greatly inflamed. Both auricles and ventricles full of blood. Parietes relaxed and chordæ tendinæ lacerated. The valves did not approximate to do their duty. Foramen ovale dilated. The whole mass weighed thirty-four pounds. The horse had been some time in Mr. Orr's possession, and had worked (but neither quick nor laboriously) constantly on the farm."

MR. HARRISON, V.S., LANCASTER, in 1836 sent an account of a case to THE VETERINARIAN, which turned out to be hypertrophy of the heart. The subject was "an aged bay coach-horse," whose state altogether was that of extreme dejectedness, with "a very peculiar expression of eye," and a countenance "wild, haggard, and pitiable." Pulse from 70 to 90, soft, and at times "in an almost collapsed state." Respiration perfectly tranquil, and no signs of pain betrayed. Partial cold sweats and tremors occasionally. Extreme parts cold. One blood-letting at the very beginning had been borne to the extent of four or five quarts; but twelve hours afterwards, on attempting a second, the blood—which was so light-coloured that it hardly stained Mr. H.'s linen—came away tardily, and, by the time two quarts had flown, signs of syncope appeared. On the seventh day he died. Large vesicles of air were found upon the surface of the lungs, which exhibited throughout "a very light pink colour." The right ventricle of the heart greatly dilated; the correspondent auricle not so much. The left cavities not much altered. In the abdomen a large tumour was discovered, attached to the posterior and inferior surface of the diaphragm, extending eighteen inches laterally, five inches superiorly, and being four inches thick. It proved to be composed of clots of blood.

DILATATION.

BY dilatation—which is also called *aneurism of the heart*—is signified, increase of capacity of any one of the cavities. When the parietes are attenuated, the dilatation is said to be *simple*; but when, although dilated, they have preserved their natural thickness, it is *dilatation with hypertrophy*. In relation to this affection, Dr. Hope says—"Although I have seen the muscular substance healthy in every form and degree of it, in general it is not so. For, when the dilatation is great, and the parietes are feeble in proportion to the quantity of blood which they have to propel, the muscle is usually more or less softened and flaccid, and in some cases of a deeper red, in others paler or more fawn-coloured than natural. The deep-red dye is attributable to venous engorgement of the muscular substance, resulting from stagnation of blood within the heart. The softening is sometimes so great, that the substance readily breaks up under pressure of the fingers."—"Simple dilatation seldom affects one ventricle without the other."—"Dilatation of the auricles scarcely ever exists without more or less thickening of their parietes." We must take care to distinguish between distention and dilatation of the cavities. "When merely distended, they are found

enlarged, firm, and tense; but these conditions almost entirely disappear when the blood is pressed out through their natural apertures. On the contrary, when truly dilated, they have no appearance of tension, are more or less flaccid, and the enlargement persists after the blood has been evacuated*."

Leblanc mentions a case of dilatation of all four cavities of the heart of a horse. Vezelesse gives an account of a heart of enormous volume: it measured a foot from base to point, and ten inches from point to summit of the ventricles; its parietes were weakened by attenuation, and several of its fleshy columns lacerated. MM. Riss and Meyer have published a case of dilatation with rupture of the right auricle of the heart of a horse: the cavity was at least double its ordinary amplitude, and its walls attenuated to that degree, that, in the place where the rupture took place, they were not thicker than a sheet of paper.

The best account of dilatation the veterinary annals of this country afford is contained in a case communicated to THE VETERINARIAN in 1834, by Mr. Pritchard.

Mr. Pritchard was requested to examine a six-year-old mare, on account of falling away in flesh. He found her poor and lean on the rib; with belly large, and coat unhealthy; although she had been for several weeks in good pasture, where she, otherwise, appeared tolerably well and lively. Pulse 84, rather hard and irregular. The impulse of the heart indicated a change in its structure, by a loud and sonorous stroke, recognized on the right side of the chest nearly as forcibly as on the left. Its beating was regular; but an unnatural rhythm, a throbbing palpitation, accompanied the stroke. The blood in the jugular veins met with considerable impediment. The regurgitation observed in these vessels at the bottom of the neck, slight in horses in health, was in this mare considerable, and extended up the neck even to the head. The belly and legs were slightly oedematous. At length, diarrhoea attacked her, and carried her off. The pericardium was thinner and more capacious than ordinary. The heart appeared unusually large and flabby; lymph was effused into the cellular substance around its base; the right auricle was very much enlarged, being three times the size of the left, and its walls thin; the right ventricle was dilated, but not at all in proportion with the auricle; the left auricle was not dilated, but the left ventricle was much enlarged, and its walls, especially at the extreme of the apex, so thin that Mr. P. felt a little astonished that it could have

* From section i, chapter ii, of Dr. Hope's Treatise.

contracted without rupture, for it was not more than one-eighth of an inch in thickness. The heart weighed ten pounds, and measured in circumference at the base two feet seven inches. The lungs were perfectly healthy. Mucous lining of the bowels tumid from serous engorgement. Absorbents of the large intestines loaded with red-yellow lymph—near to the receptaculum chyli, with blood. The thoracic duct contained principally blood, but was not much dilated. The liver was in a state of sanguineous engorgement, weighing nearly thirty pounds. There was extravasation of blood into the parenchyma.

OSSIFICATION OF THE HEART.

MR. A. Henderson, V.S., London, has in his museum a remarkably fine specimen of this disease. The parietes of the right auricle are converted into osseous substance; consequently, that cavity could have been but a passive receptacle for the blood: the current must have continued without any, or with hardly any, fresh impulse into the ventricle. All that Mr. H. knows about the case is, that the horse from which the heart was taken, dropped down dead, in emaciated condition, in a dust-cart.

AIR IN THE HEART.

DR. HOPE* received from Dr. Forbes, of Chichester, the following communication:—"I yesterday examined a boy who had died suddenly, after being affected for years with all the symptoms of extreme dilatation of the heart. I found the organ very large from dilatation of both ventricles, and both were distended with air—in all eight or ten ounces. There was no particular putridity, the boy having been dead only thirty-six hours." The Doctor informs us that a similar case is recorded in Simmons' London Medical Journal for 1785; and adds—"As air in the ventricles is incompatible with the maintenance of life, it must, in these cases, have been generated, or conveyed there, after death."

In 1837, without being aware that any similar observation had been made either on man or animals, I sent the subjoined account to THE VETERINARIAN:—

* Chapter iv, of Dr. Hope's Treatise.

A horse, three years old, was taken unwell after the ordinary mode in which a febrile catarrhal attack commences. He was off his feed; dull and dejected; and his pulse was increased to about 55. He took three drachms of aloes, and lived upon a bran diet, and was ordered to be kept quiet in his stable. The day following he was removed from his stable into a box; but nothing further was done, the medicine appearing to be about acting on the bowels. The morning of the third day he purged: water-gruel was now substituted for water for his drink. He ate his hay, and appeared to be doing well. His pulse continued between 55 and 60; but was grown so feeble at the jaw that more than ordinary attention was required to perceive the beats of the artery. I saw him alive for the last time at one o'clock, on this (the third) day. At five o'clock, P.M., he had drunk a pailful of gruel, and still appeared going on well. At half-past six, P.M., he was found dead in his box; having, from the position of the carcass, evidently fallen quite suddenly, and, as it would seem, died without a struggle.

Being fully prepared to meet with some post-mortem appearance out of the common way, more than usual pains were taken in opening the body. The sternum was carefully removed by sawing through the cartilages of the ribs, without cutting into or disarranging the pericardiac membrane. No sooner was the pericardiac case opened, than out protruded the heart with a very unusual sort of jerk, it appearing as if the bag containing it were too small for it, and it were pressing for liberation. Denuded of its bracing membrane, the heart appeared—the right ventricle in particular, which now lay uppermost—enormously distended, and the tumefaction conveyed to the pressure of the fingers the sense of fluctuation. I, myself—as well as my friend, Dr. Campbell, who was present at the examination—opined, either that fluid blood or air must be within. I cut into the ventricle transversely, near its apex, with a scalpel, and, to my surprise, a quantity of air burst forth, the parietes of the cavity instantly collapsing just in the manner a distended stomach or intestine would have done; and what adds to this similitude is, that the escaped gas had a fetid odour. This was followed by a copious efflux of fluid, grumous, ill-conditioned blood, which, as it flowed, bubbled and frothed as though air had been mixed up with it. The parietes of the right ventricle were unusually thin from the dilatation they had undergone; while those of the left ventricle were in altogether an opposite state of extraordinary contraction and density, almost to the obliteration of its cavity. The auricles both contained blood; but there was this difference—that, in the left, the coagulum was unusually small and firm, while the blood in the right was very loosely and but imperfectly coagulated. The coagula in the pulmonary veins were perfect, but soft and black, and easily lacerated. The right lung was dark-coloured, and in places exhibited incipient hepatization: the left lung was in a perfectly sound condition.

RUPTURE OF THE HEART.

THIS sad and fatal lesion arises in one of two ways:—it may either be the result of mechanical force, or it may be the product of ulceration.

ANY VIOLENT ACTION OR EXCESSIVE EXERTION may prove the occasion of rupture in a heart perfectly sound and healthy. I recollect, some years ago, during one of the racing meetings that used to be held annually at Woolwich, one of the horses, who had vehemently contested, and lost only by half-a-neck, a heat, suddenly falling and dying just after he had passed the winning-post; whose body I afterwards examined, and therein found the heart, burst: I think it was the right auricle that had given way—the animal had literally died of “a broken heart.”

In my regimental predecessor's time, one of the troop-horses, intended to mount king's guard, from the same cause, “dropped down dead” on the parade.

OF RUPTURE FROM ULCERATION, there is a case related by M. Gaullet, in the *Recueil de Médecine Vétérinaire*, which appears to afford an example.

A horse, seven years old, had experienced within a short lapse of time three or four fits resembling those of epilepsy, the prominent symptoms of which were;—stiffness of the fore limbs, with spasm and tremor of the muscles of the shoulder and arm; the eyes much turned inwards, the opaque cornea alone being visible; the animal moved with so much difficulty, that, if compelled to stir, he fell and lay for half an hour in a state of rigidity, grinding his jaws; then arose again, and fed as though nothing had happened. For a month before he died, this horse was treated for pulmonic disease; in the course of which, they took him out for a little walking exercise. In his walk he met with rather a sharp ascent, which, for want of breath, he could not climb. Some days afterwards the same attempt was renewed, but with no better success. An hour after his return to his stable from this last journey, the horse was seized with his former symptoms, fell backwards, and remained down for half-an-hour, with his neck in a state of tetanic rigidity. Fifteen days after one of these fits, he died. The abdominal viscera, the pleuræ, and the lungs, were sound. About the middle of the right ventricle of the heart was discovered a small fistulous aperture, with smooth borders, and from one to two lines in diameter, through which issued a pale sanguineous fluid.

Within the ventricle, communicating with the aperture, was a longitudinal rent, an inch-and-a-half in extent, but diminishing in breadth towards the opening outside, which was surrounded by whitish and slight tumidity, half-an-inch in circumference.

Along with the above, M. Gaultet communicated an analogous case to the Central Society of Agriculture. The horse experienced great difficulty in moving, with especial inconvenience on the left side, and no one could divine the cause. Twenty-five days after the attack he died. The right ventricle presented an old rupture, which shewed for some breadth the commencement of cicatrization.

ANEURISM OF THE AORTA.

ALTHOUGH aneurism is by no means an uncommon disease in our own bodies, in horses it is very rare ; so rare, that it never has, that I know of, become an object of veterinary practice. Nevertheless as extraordinary occurrences, accounts of cases must be at all times interesting to the veterinarian, and as such I give those that have come under my own observation.

The first I shall notice is a dried preparation that belonged to my father's museum, at Woolwich, a very fine specimen of aneurism of the thoracic aorta. In shape, and indeed in magnitude, it may well be compared to a gourd of ordinary growth. Through the bottom of the aneurismal sac are two large circular apertures where, evidently, it had burst into the cavity of the chest. In several places the sac is much attenuated, and appears—as far as one can judge in its dried state—to have been in an ulcerated condition at the time of death. Whether the sac is formed of the dilated or augmented coats of the vessel, or is composed of adventitious coatings, it seems impossible, correctly, to determine : its appearance most favours the latter supposition. No other history attaches to the preparation than that “it was brought from the slaughter-house.”

Mr. Field has in his museum in London a preparation of the same kind as the one described above, and in most respects very similar to it.

The following cases occur in the Foreign Journals :—

In the *Journal Pratique* for September 1826, are two reports of aneurism by M. Chenard. A mare was led to him having fistula. She could hardly, he observed at the time, drag her hind legs after her. She had no sooner got into the stable, than she fell on her haunches, and never rose again. She was bled and purged ; but died on the sixth day. Internal tunic of the aorta highly inflamed ; and immediately behind the emulgent artery was a true aneurism

as large as a hen's egg. Just below was an aperture in the vessel which protruded in the form of a pedicle, and communicated with another tumour, of the size of a child's head, full of fibrous matter, laminated. A similar clot filled the artery posterior to dilatation. The membranes occupying the spinal marrow in the lumbar region were also highly injected, and the marrow itself was softened and surrounded by a serous fluid.

Another mare, usually full of animation and energy, suddenly, and without assignable cause, became spiritless and incapable of work. This continued for some months, when attention was directed to her loins. She turned with difficulty; shrunk from pressure on the loins; was costive; and voided her dung and urine with straining and pain. She was treated for nephritis, and got better; but after a very little work every symptom relapsed. Two months afterwards her hind legs commenced swelling, and this went on to produce ulcerations, all which subsided again. One day she was seized with cramp in the near hind leg, for a quarter of an hour. In two months again she got so well as to be considered fit for work. She performed one journey; but had hardly commenced a second, when she on a sudden lost the use of her limbs—she fell upon her off side, uttering dreadful cries. She continued for two days paralytic in her hind parts, and died. The posterior aorta at the root of the emulgent artery was dilated to double its ordinary caliber, and a tumour, osseous above and cartilaginous below, communicated with the aorta by an aperture the size of a nut, with attenuated edges. The aneurism ended abruptly near the origin of the crural artery. The internal coat was ulcerated where the ossific process had taken place, and a clot completely blocked the dilatation and the posterior divisions of the aorta, and extended even to the origin of the renal arteries. The membranes of the spinal marrow were also highly inflamed above the lumbar region; and the marrow itself softer than natural, and covered with bloody spots.

The subjoined case occurred in 1826, at the College at Alfort:—

A mare was brought in very lame from a sinus in the foot, perforating the long flexor tendon, which was treated for three weeks; when one day, while the foot was being dressed, the mare suddenly reeled about, threw up her head, and fell down. No sooner was she down, than her nostrils and chest and belly and flanks were all in convulsive action for breath; her limbs became stretched out; and her eyes rolled in their orbits. The jugular was opened instantaneously; but drops of blood only issued. In the very act, death closed the scene. The pericardium prodigiously distended with coagulated blood, looking at first like hypertrophy of the heart. This coagulum weighed five pounds. The trunk of the aorta was extensively ruptured at its base, and the lesion was evidently the result of attenuation of its coats.

ANEURISM OF THE ILIAC ARTERY.

Mr. King, V.S., Stanmore, shewed me a dried preparation—a specimen of an aneurismal tumour, communicating, as it seemed to him (for there was much confusion of parts), with the external iliac artery: if not with that, with the gluteal. The aneurismal sac was composed principally of the parts immediately adjacent. In several places it had become ossific: indeed, so large and evidently spreading were some of the patches of osseous matter, that, had the animal survived any great while longer, there is little doubt, ultimately, the whole sac would have become converted into bone. The history of the case, was—A horse, not worth much, was casually brought into Mr. K.'s yard with a tumour equal in volume to a large pumpkin, and of an irregularly ovoid shape, upon the postero-superior part of the quarter. Finding it fluctuated, Mr. K., by way of experiment, punctured the swelling with a lancet. A gush of blood followed the puncture. Compresses of tow, cloths, bandages, &c., were immediately applied. In the end, however, the animal became reduced, and died.

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SECTION IX.

DISEASES OF THE TEETH, PHARYNX, AND
ESOPHAGUS.

DENTITION
LAMPAS
SHARP } TEETH
PROJECTING }
CARIOUS TEETH
PARROT MOUTH

TUMOURS UPON THE FACE
SALIVARY CALCULI
STRICTURE OF THE ESOPHAGUS
CHOKING
ESOPHAGOTOMY.

DENTITION.

BY DENTITION is meant the breeding and cutting of the teeth. From a few months after birth until the fifth year of his age, the horse may be said to be breeding and cutting teeth. It is not, however, with the animal as with children, who sicken and even die in tender infancy from the cutting of their first teeth; on the contrary, his sucking teeth appear to cause him as little inconvenience as our permanent set do ourselves, whereas the coming of his second teeth occasionally causes him somewhat of the same kind of suffering and irritation which we so often observe among children. There is, connected with dentition, another peculiarity in the horse which we must not let slip our observation. Although the period of teething, properly so called, may be said to be limited to the fifth year, yet we must recollect it has been satisfactorily demonstrated, that in him there is a process of growth going on in the teeth through the remainder of life; so that, in fact, at no period can the animal be said to be exempt from the influence of dentition. This accounts for lampas appearing in old as well as young horses, and furnishes my mind with strong proof, that the tumidity of the bars of the mouth is dependent upon operations going on in the teeth, and upon that cause alone.

There was a time when, I must confess, I treated the subject of dentition so lightly as to think that horses never suffered or became

disordered from such a cause. Experience, however, has altered my opinion. I can now, in practice, frequently discover young horses with disorder or febrile irritation upon them, the production or continuation of which I hesitate not to ascribe to teething; and I find these views borne out by the relief obtained by the increased attention I am in the habit of giving to this assumed cause in my treatment. In illustration of this, I will here relate a case which occurred to me many years ago; the very one, in fact, which proved the occasion of my looking afterwards more closely into dentition.

I was requested to give my opinion concerning a horse, then in his fifth year, who had fed so sparingly for the last fortnight, and so rapidly declined in condition in consequence, that his owner, a veterinary surgeon, was under no light apprehensions about his life. He had himself examined his mouth, without having discovered any defect or disease; though another veterinary surgeon was of opinion, that the averseness or inability manifested in mastication, and the consequent *cudding*, arose from præternatural *bluntness* of the surfaces of the molar teeth, which were, in consequence, filed; but without beneficial result. It was after this that I saw the horse; and I confess I was, at my first examination, quite as much at a loss to offer any thing satisfactory as others had been. While meditating, however, after my inspection, on the apparently extraordinary nature of the case, it struck me that I had not seen the tusks. I went back, and discovered two little tumours, red and hard, in the situation of the inferior tusks, which, when pressed, gave the animal insufferable pain. I instantly took a pocket-knife, and made crucial incisions through them, down to the coming teeth, from which moment the horse recovered his appetite, and by degrees his wonted condition.

The above case might likewise be quoted in illustration of another fact connected with this subject, which is, that the cutting of the tusks—which may be compared to the eye-teeth of children—costs the constitution more derangement than the cutting of all the other teeth put together; on which account, no doubt, it is that the period from the fourth to the fifth year is so critical a one with the domiciled horse. Any disease, pulmonary in particular, setting in at this interval is doubly dangerous, from its being augmented or kept up by the irritation of teething: in fact, teething is one auxiliary cause of the known fatality among horses at this term of their existence.

Reasoning, *en philosophe*, on the subject, with a view of shewing in what manner teething is necessarily productive of the conse-

quences ascribed to it, D'Arboval tells us to observe how the vital energy becomes augmented about the head, and upon the mucous surfaces in particular. "A sort of local fever originates in the alveolar cavities, running high or low according to the resistance the teeth encounter from the hardness of the jaws or their own disproportioned size and solidity. The gums become stretched; from the pressure of the teeth against them, they dilate, sometimes split; at the same time they are red, painful, and hot, even to a sense of burning, and they spread. Internally, the roots of the teeth, from shooting downwards, compress the dental nerves, and painfully drag the periosteal linings of the alveolar cavities. These continued causes will sufficiently account for the local irritation and suffering accompanying teething, and enable us to explain many morbid phenomena we find appearing in horses at this—from various circumstances—the most critical period of their lives*."

THE EFFECTS OF DENTITION upon the constitution may be comprised under the heads, excitation, fever, catarrhal disorder, cough, glandular swellings, ophthalmic irritation, cutaneous eruption, derangement of the bowels, urinary disturbance, loss of appetite and consequent emaciation. My respected predecessor, the late Mr. Bloxam, has left behind him, in his Registry of Sick, several such entries as "fever from dentition"—"suffering from dentition;" which is evidence sufficient to shew, that his opinions on this subject were much the same as I am endeavouring to inculcate here; and, let me add, they were the result of very long experience, and most patient and attentive observation. Excessive or long-continued local irritation and suffering induces a habit of nervousness and susceptibility, rendering the body doubly prone to the operation of morbid agents, and augmenting the violence of the malady when once disease has set in. For this reason I, for my own part, invariably make it my rule in practice, when young horses are brought to me sick or unwell, to inspect their mouths, and, in particular, to notice the tusks, which, should they be prominent and pushing against the gums, I let through by making crucial incisions upon their summits: at the same time I remove

* See Hurtrel D'Arboval's "*Dictionnaire*," article "Dentition."

any of the sucking teeth that may appear to be obstructing the growth of the set to come. In this way I feel assured I have seen catarrhal and bronchial inflammations abated, coughs relieved, lymphatic and other glandular tumours about the head reduced, cutaneous eruptions got rid of, deranged bowels restored to order, appetite returned, lost condition repaired. I am quite sure too little attention has been paid to the teeth in the medical treatment of young horses; and I would counsel those who have such charges by no means to disregard this remark, trifling as it may appear.

LAMPAS.

WITH the subject of dentition is closely allied another one, to which those knowing in horse matters, but unread in medical philosophy, attach great importance, called "lampas." According to D'Arboval, the word is of French origin: it is a "*terme de manège*" that has found its way into veterinary medicine, from the circumstance of its having been, figuratively or burlesquely, used to signify the palate or inside of the mouth. What we, now-a-days, understand by lampas, is, an unnatural prominence or tumidity of the cartilaginous bars which form the roof of the mouth. These bars, naturally, are pale coloured, and arched in figure; whereas, in a mouth affected with lampas, they are red and tumid, and appear bulging, descending upon a level with the surfaces of the upper nippers, and in some cases even below them. This apparent augmentation of substance is, no doubt, ascribable to congestion of blood; but not to that alone; for I believe in many cases there will be found to be some infiltration of serous and albuminous matters into the cellular membrane attaching the bars to the hard palate; which will account for the length of time they are known sometimes to continue, as well as for the little relief that in such cases attends lancing of the gums. Although in young horses it is, I believe, admitted by all horse people, that lampas is occasioned by the cutting of the teeth, yet, in old horses, there are those who ascribe their production to other causes, and imagine they have a good deal to do with the animal's state of health, or rather with his feeding. That they may in some cases be the occasion of sore-

ness in mastication, I do not deny; at the same time I think I may safely affirm, that, nine times out of ten, the cause of loss of appetite will be found elsewhere. The reason why lampas appear in aged horses, is, in my opinion, as I before stated, on account of the continuance of the process of growth, demonstrated to be going on, through life, in the teeth, with the nature and laws of which we are, in our present state of knowledge, too little acquainted to pretend to say why the lampas should exist in one horse and not in another, or why it should only at times appear in the same horse.

ARE LAMPAS DISEASE?—The complaints, frequent and grievous, which are daily reaching our ears, are enough to persuade us they are; every groom that has an unthriving horse, or one that does not feed, is sure to search for lampas; and, should he find any, in his mind the cause of failure is detected, and the remedy obvious—"burning them out." Many a poor wight of a horse, even while suffering from some real constitutional malady, has been subjected to this torturing operation, with a view of demonstrating the sagacity of the groom, and thereby has got added to his other ailments, a foul, sloughy, carious sore upon the roof of his mouth. This may be said to be the fruits of

THE REMOVAL OF LAMPAS.—Supposing that their existence is owing to the teeth, surely the teeth should be removed, and not the bars of the mouth. In cutting or burning away the lampas we are mistaking the effect for the cause. If it be contended that lampas do not owe their production to the irritation of teething, then I should like to be informed what does give rise to them: and, let what will give rise to them, I do not imagine there is any veterinarian hardy enough to contend, that the cause resides in the palate and becomes removed by the actual cautery! Those who are entering private practice, and find themselves compelled, at times, to belie their consciences by the performance of unnecessary operations to please their employers, may be told, that burning out lampas is, after all, preferable to lancing or cutting the bars; for, unless the palatine artery is wounded, very little blood is obtained by stabbing the mouth; and the wounding of this vessel, which will certainly take place

should the punctures be made along the sides of the palate, or extend forward beyond the fourth bar from the front teeth, is not always a very safe proceeding. I remember a case of the kind in which it became necessary to bind compresses of tow firmly upon the bleeding parts, by carrying a broad tape around the jaw between the tusks and corner incisors, and confining it there by tying its two ends in a knot upon the front of the gum, underneath the upper lip. After a couple of hours the compress was removed, and the hemorrhage proved to have been permanently stopped. Had the operation of *torsion* been known to me, I should, I think, assuredly have succeeded in stanching the hemorrhage with much less trouble and in infinitely less time.

THE OPERATION OF BURNING, if it must be performed, appears best done in the old farriers' mode of proceeding. An iron, shaped as under,



is heated to redness, and with its edge, which ought to be sharp, a portion of the substance of the bars, about the size of a crown piece, from the middle and most protuberant part, is sliced off: care being taken that the instrument does not penetrate deep enough to sear the bone. This at once gets rid of the assumed evil, and is altogether the preferable operation, and will not, performed in this partial and cautious manner, be productive of any very great mischief.

SHARP AND PROJECTING TEETH.

AMONG the annoyances and hindrances the horse experiences in his eating, may be classed a sharpened and overgrown state of the molar teeth or grinders. Some irregular action in the jaws occasions a slanting wear of their grinding surfaces, and the consequence,

in the course of time, is, the projection to a considerable extent of one of the lateral edges beyond the opposite one, and the conversion of the grinding surface, from an asperous level, into an inclined plane, of greater or less extent according to the length of time the change has been going on. It would appear that this irregular action is the effect of some original malformation of the jaws, whereby the teeth have a wrong direction given to them, or, at least, do not come into that complete apposition which is so essential to their due masticatory operation. The wear, instead of being level and uniform, takes place all on one side, while the opposite unworn side continuing to grow, the consequence, in process of time, is, a production at once most remarkable and unnatural, of which Mr. Henderson, V.S., Park Lane, London, has in his museum a very beautiful specimen.

Not only are the teeth, when they have acquired this unnatural shape, in a measure unfitted for the purposes of mastication, but are, by their projections, apt to excoriate and lacerate the sides of the cheeks or the tongue*, depending upon which jaw they are situated in, and whether their sharpened edges are slanting inwards or outwards. What commonly leads to the discovery of this condition of the teeth, is, the horse being observed to cud his hay: either he puts the cud out of his mouth after masticating it imperfectly, or else he retains and collects it between his cheeks and grinders, where it gives externally the appearance of a swelling a little above the angle of the mouth. At times a flow of saliva accompanies the cudding. And, in consequence of much of his aliment being thus lost to him, sometimes the animal is perceived to fall away in condition.

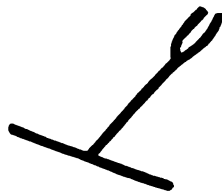
THE REMEDY FOR SHARP GRINDERS is the tooth-rasp. I have in all the cases of this description that have occurred to myself used this instrument with success, without having had occasion for any thing else. The French prefer breaking off the salient portions of the teeth by means of a hammer and chisel, the mouth being

* These excoriations, and the ulcers they occasionally give rise to, are noticed in vol. i.

kept open the while with a gag, or a ball-iron; in regard to which proceeding I can only repeat, I never myself found any thing necessary beyond the tooth-rasp.

PROJECTING TEETH.—When once a tooth, whether it be an incisor or a molar, has lost its opponent, and thereby becomes deprived of all counter-pressure, it shoots beyond its fellows in the same jaw, and is apt to grow to such a length as not only to interrupt mastication, but even impede the closure of the jaws. Mr. H. Surmon relates—in vol. ii. of *The Veterinarian*—a very instructive case of this description.

A neighbour of his possessed a horse that had continued to lose his appetite and condition for some weeks. The first time Mr. S. examined the mouth he perceived nothing extraordinary. The horse, emaciated to a skeleton, was to be destroyed. Mr. S. examined his mouth once more, and, with a balling-iron keeping it open, he introduced his hand, and discovered two lower teeth, one on each side, which had outgrown the others to that extent that they were actually pressing against the roof of the mouth. Mr. S. made attempts to extract them with a key, such as is used by surgeons; but this proved fruitless. He afterwards contrived an instrument, with which he perfectly succeeded. In using it, he passed the forked end into the mouth, and fixed the tooth to be extracted within the fork. The handle—a most powerful lever—being then turned on its axis, the tooth became forced out with the greatest ease. The horse Mr. S. operated on, began after the operation to feed again, and soon recovered his health and strength, and went to work as well as ever.



This instrument, however, amounts to nothing beyond the ordinary tooth-key upon a magnified scale, and is in many respects not so efficient, in consequence of its wanting the adjusting and grasping powers of the key. Mr. Cherry, the Principal Veterinary Surgeon to the Cavalry, is in the habit of using a key of such large dimensions that the handle is intended to be turned by *both* hands of the operator, which affords him a lever-extractor of highly augmented power: and such is the instrument I should myself recommend for the extraction of horses' teeth.

CARIOUS TEETH.

DISEASE of the teeth is rare in the horse. He is not an animal that can be said to be subject to tooth-ache; though there are instances on record of carious teeth being discovered, and of their being productive of such consequences as have led, through error, to a fatal termination. The following relation ought to operate on our minds as a warning in pronouncing judgment in cases of glanders, or at least in such as assume the appearance of glanders:—

A horse, the property of Government, became a patient of Mr. Cherry's, on account of a copious defluxion of fetid, discoloured, purulent matter from the near nostril, unaccompanied either by submaxillary tumefaction or by ulceration of the Schneiderian membrane. For two or three months the case was treated for glanders; but, no amendment appearing, a consultation was deemed necessary, the result of which was, the horse was shot. On examination of the head, the third molar tooth proved to be carious; one-third of its fang being already consumed, and the remainder rotten. The formation of an abscess within its socket had rendered the tooth loose, and the matter flowing therefrom had established a passage into the contiguous chamber of the nose. The antrum, also, was in part obstructed by the deposition of osseous matter. This is a case, then, which, but for the vigilance of Mr. Cherry, would have indiscriminately merged in that heterogenous combination of diseases under the appellation of *chronic glanders*.

My father's museum contained several preparations of carious teeth.

One was that of a molar tooth, whose interior was black and rugged, from being eroded by ulceration, and whose fangs had from the same cause mouldered away. Two others presented brittle exostoses upon their sides, forming spacious cavities within, and communicating with the contiguous grinders. One of them exhibited a perforation, through which pus appeared to have issued. They seemed both to have been cases that had originated in internal injury.

The rarity of such occurrences disinclines one to seek for them; and, especially, since we are not in possession of any sure indications of their existence. Cudding the food, fetid breath and saliva, either with or without any purulent issue from the nose, might lead to an examination of the mouth, and the discolouration of a tooth would prompt us to ascertain whether it were loose or not, and if loose to extract it: further than this I am not prepared to advise.

PARROT MOUTH.

By this appellation horse-people understand what dog-fanciers call "overhung;" *i. e.*, a mouth so formed—or rather so malformed—that the upper jaw overshoots or projects considerably beyond the lower; so much so, that the inferior incisor teeth, instead of meeting their opponents, come in contact, when the mouth is shut, with the bars of the palate; while the teeth of the superior jaw have no opponent surface whatever, unless the lower lip can be so regarded. This deformity is not a very common occurrence; nor is it one altogether so objectionable, since the horse has the power of gathering up his hay and corn with his lips, although the process (as well as the retention of the food while it is being transferred to the grinders) is but imperfectly performed, as is seen by the animal, while feeding, scattering and wasting part of his corn, and slobbering a great deal. In grazing, the parrot mouth must be greatly more disadvantageous; much difficulty must of necessity be experienced in nipping off the grass; and this seems to me to be the chief objection to the purchase of such a horse: at least, this formed the ground of objection, I remember, of a recruit horse with a parrot-mouth that was offered to the 1st Life Guards.

TUMOURS UPON THE FACE.

THOSE who are much among young horses will have occasionally observed osseous swellings to arise upon the side of the face, midway between the eye and the angle of the mouth. They grow from the superior maxillary bones, have a rounded form, and are broadish at their bases, with hardly any perceptible heat of surface, and very little tenderness on pressure. Sometimes one appears; oftener, I believe, there exist a pair. What their origin may be, I know not, unless they be the effects of blows. In composition they are evidently osseous, or osseo-cartilaginous: in fact, they are veritable exostoses. They are nowise hurtful or injurious; but they extremely disfigure the countenance of the animal: they give him a sour, ill-tempered look, and on this account are often sought to be got rid of.

A three-year-old horse came to my regiment, out of the dealer's hands, with a tumour of this description upon the off side of his face. Not liking the appearance of it, the colonel was desirous I should get rid of it. I blistered it repeatedly. I next tried the effects of an iodine ointment upon it: all to very little purpose however. It was thought to have diminished, but very little. I had a notion that stripping it of its periosteal covering, and leaving it bare, might cause it to exfoliate away: but this seemed to be attended with some danger of the sloughing laying open the maxillary sinus; and on that account was the project abandoned.

Mr. Charles Percivall, V.S. Royal Artillery, has sent me the following account of the same disease:—

A four-year-old gelding came into the Infirmary with a tumour upon the maxillary bone of the off side, followed, some days after, by enlargement of the submaxillary glands, and discharge from the nose, upon the same side. The swelling appeared painful on pressure, and my first idea of its nature was, that it had proceeded from a blow. Cold applications were made use of; ultimately, it was blistered. This caused it to suppurate and discharge a glairy ill-conditioned sort of matter. At the expiration of three weeks, the near side of the face commenced swelling in the same manner, which convinced me I was wrong in imagining the other tumour was caused by injury. The same treatment was pursued; but this did not suppurate. I then used the iodine ointment, which appeared to diminish it. The tumours upon the off side became fistulous, continually issuing the glairy matter, as at first, and giving evident signs that the bone within was in an unsound—most likely, carious—condition.

SALIVARY CALCULI.

BRITISH veterinary practice appears to have been eminently unproductive of cases of this description. Were it not for the superior advantages of observation possessed by continental veterinarians, we should have felt at a loss in what way to have supplied this place in our nosology.

From D'Arboval—our principal source of information—we learn that calculi have been discovered within most of the salivary glands, but are more commonly found within their ducts, and particularly within the parotid duct. They have a whitish aspect, take the form of the canal, and are extremely hard and weighty,

tasteless, and odourless, and have an oat or small pebble, which has got into the duct through the mouth, for a nucleus. When lodged in that part of the duct which is but skin-deep, they are perfectly obvious; but when sticking just within the orifice of the canal, unless of considerable volume, they are very difficult of detection. In this situation, when projecting, the calculus will sometimes occasion excoriation of the buccal membrane, and so far will render mastication painful and difficult, besides more or less obstructing the efflux of saliva; and it may create some sort of noise during the motions of the jaws by gritting against the teeth: these constitute the evils arising from its presence. In general, the growth of this kind of calculus is extremely slow; so that it is some considerable time before these effects are produced. When it has got sufficiently large to cause obstruction, the portion of duct between it and the gland becomes swollen from the accumulation of saliva. According to the analysis of Thenard, these calculi are composed of calcareous phosphate in combination with some little carbonate of lime.

TREATMENT.—We possess no means of dissolving these calculi; but we can extract them, and in some cases without cutting into the duct—an operation now and then succeeded by a troublesome fistula. When the stone proves to be at the buccal orifice of the canal, and the molar teeth present the only obstacle to its escape, it will often be sufficient to extend the cheek and give it a good shake or two with the hand to liberate it. Should the calculus appear to be strangulated within the canal, we must divide the stricture first. This may be done by fixing the mouth wide open with a ball-iron, and introducing a bistoury tied to a stick to serve as a long handle, while the other hand is engaged in drawing the tongue out of the way. Should the stone not fall out after the division of the stricture, it may be seized with forceps and extracted. A mash or liquid diet ought to follow the operation.

Even when not at the orifice, but felt externally under the skin, should the calculus not be large, some dexterous manipulation might force it onward into the mouth. As it but seldom happens, however, that our attention is drawn to it before its bulk is such as to preclude the possibility of stirring it, we are in general necessi-

tated to incise the duct in order to extract it. And in making our incision, we are to do it cautiously, in the direction of the canal, from one extremity to the other of the tumour; and as soon as we have extracted the calculus, either with our fingers or forceps, take special care to approximate the lips of the wound, and retain them in apposition by some adhesive plaster, lest we incur the consequences of a fistulous duct, which sometimes amounts to an evil as great as, or even greater than, the calculus itself had proved. In some cases sutures may be found requisite. A compress may generally with advantage be applied upon the portion of duct intervening between its gland and the wound. A great consideration in the treatment is, to keep the jaws as quiet as possible; and therefore the horse should be supported for some days upon liquid aliment. Although it is right to take such precautions, many of these wounds heal and do well with comparatively little care. M. Vieillard extracted salivary calculi from three troop-horses without leaving any fistula. And M. Girard has seen the gland itself cut into for the purpose of evacuating a salivary abscess, and complete cicatrization ensued.

This account is followed by the relation of several cases which illustrate what has been said; but which there would be no great use in inserting here.

STRICTURE OF THE ESOPHAGUS.

By *stricture* is meant a diminished or contracted state of some tube or duct of the body. In man, we find strictures occurring in all the mucous canals—esophagus, intestines, urethra, vagina: in the horse they have hitherto been discovered in no others, I believe, but the esophagus and intestines. A stricture is either *spasmodic* or *organic*: that is, the muscular or contractile power of the tube only is at fault; or else, its lining membrane is thickened, and perhaps altered in structure as well. The stricture I am going to treat on will be found to be of the organic kind. Its occurrence is rare; at least I argue so, from having myself come to the knowledge of but four instances of it.

THE SYMPTOMS of a strictured esophagus, so far as I have been

enabled to note them, are, at first, a gradual falling off in strength and spirits and appetite, with some attendant febrile disorder; cudging not only hay, but corn likewise, and ejecting both, either through the nose as well as mouth, or through the mouth alone, after they have been thoroughly masticated and mingled with saliva, and rendered, in fact, fit to be swallowed. In some cases the disgorged cud does not seem to have entered the esophagus at all: the animal knowing he cannot swallow, appears not to attempt it. In other cases, the cud descends as low down into the gullet as the seat of stricture, and there lodges until disgorged again, causing distention of the tube at that part, and, in time, the formation of a considerable sac. Now that the horse disgorges the greater part or whole of the solid food he consumes, the appetite, from having been indifferent, becomes painfully keen: no sooner is a fresh supply of provender set before the animal than he seizes and devours it with avidity; but, alas! it proves in the end only the means of augmenting his suffering; for, hardly has he masticated it before he discovers his inability, or rather the pain and difficulty he will experience, to swallow, and consequently prefers returning most, if not all, of what he has been chewing into his manger. Thus deprived of his aliment, the animal daily continues to lose flesh, and with it his strength and spirits, everything around appearing after a time indifferent to him, save his fresh feeds, which he plucks up to eat with renewed vigour, only, however, to encounter renewed disappointment. There exists in general no unwillingness or impediment to his swallowing his water; nor are balls even, during the early stages of the disease, rejected. His skin, after a time, becomes hide-bound; his coat harsh and dry and scurfy. Early in the complaint, the bowels are commonly much constipated, and require repeated aperients to keep them soluble: later, a diarrhoea is apt to supervene. A slow fever accompanies these symptoms: the pulse commonly ranging between 50 and 60. The horse lies down sometimes of a day as well as night. Emaciation proceeds, until, from debility and inanition, the exhausted animal sinks to rise no more.

THE SEAT OF STRICTURE varies. In two cases which occurred in my own practice, it proved to be the place where the esophagus

enters the stomach—the *cardia*, as we call it. My friend, Mr. King, of Stanmore, related a case to me, in which he fancied there existed a stricture in the *middle* of the canal. A very interesting case, published in *The Veterinarian* for 1830, by Mr. Cheetham, of Glasgow, leaves no doubt on this point, and throws fresh light on several others.

Mr. Cheetham was called to attend a mare belonging to an officer of the 4th Dragoon Guards. She discharged masticated food from the nose; and on the near side of the neck there was a swelling, in the situation of the esophagus, as large as a person's arm, commencing about six inches from the pharynx, and gradually increasing to opposite the sixth cervical vertebra, and there terminating abruptly. There had existed a partial obstruction for many months, which had so increased of late, that the animal had been obliged to be drenched with water to wash down the contents of the sac: on other occasions a probang had been used. After such palliations as these, a blister was applied over the tumour, and she was turned to grass. While there, it was observed that food, lodged in the sac of the esophagus, was frequently returned into the mouth, and afterwards re-swallowed, and then passed into the stomach. On being taken from grass, a quantity of corn was given to her, in order to ascertain if the stoppage still existed. The corn accumulated the same as before. Mr. C. determined on an operation. He made an incision four inches long into the esophagus, opposite the sixth cervical vertebra. The tube seemed divested of its muscular fibres, and was composed of cuticular coat alone. The contents of the sac were removed, and she was drenched with warm water to wash out the esophagus. The sac appeared three or four inches in diameter; but the opening leading from it, below, was so contracted, that it only admitted a probang half an inch in diameter. After the operation the mare drank freely of warm water, which, by applying pressure upon the wound, passed uninterruptedly into the stomach; though without the pressure the greater part escaped. She was bled, and had an aperient. The wound was fomented, and poulticed, and dressed; and the mare partook freely of gruel. Some sloughing followed, which brought away part of the esophagus; after which the wound became healthy. Mr. C. now introduced a probang, of the dimensions of the first he used, through the structure; which operation he repeated twice or thrice a-day for ten successive days, with probangs of larger size. Thus was the stricture—which appeared to have been seated at the place where the tube enters the chest—overcome; and since then the probang has been occasionally introduced by the owner himself. To assist the mare in swallowing, the sac was aided in its action by pressure, accomplished by a broad breast-plate, furnished with a pad. The sac gradually grew less; and the mare at length became enabled to consume her rations, and soon after recovered all her life and gaiety.

THE APPEARANCE OF THE CARDIAC STRICTURE is this—The esophageal orifice at the stomach is contracted to the utmost degree: in one of my cases, a sharp-pointed instrument was with difficulty introduced. The muscular fibres surrounding the strictured part are prodigiously augmented in volume, and, in addition, there is a morbid thickening of their lining, arising from deposition into the cellular substance interposed between the muscular and cuticular coats. The cuticular membrane is thrown into rugæ unusually large, and is evidently increased in substance. The stomach itself is not affected.

TREATMENT.—The two cases that came under my notice were not unmasked until death had afforded the opportunity of investigating their nature, and consequently were not submitted to any specific or appropriate treatment. Were I to encounter another, I should endeavour to pass a bougie, of proper size, as far as, or even into, the stomach, with a view of ascertaining the seat and nature of the obstruction; which, being ascertained to be stricture, might possibly admit of dilatation, or of the conveyance of caustic to it. Should, however, so long a passage for the bougie render it unavailable against the stricture, we must do as Mr. Cheetham has already done—make an incision through the neck into the esophagus, and pass the bougie or probang from there. A cardiac stricture would, of necessity, prove a very troublesome, perhaps an intractable, affair: one within the neck, or even the chest, might admit of being overcome.

CHOKING.

EVERY now and then it happens that a portion of food, or some solid body, becomes lodged within the pharynx or the esophagus, without the horse possessing the power either to swallow or to disgorge it. Grain, small potatoes, pieces of turnip or carrot, a ball of large size or hard consistence or improper shape, even an egg, have all of them proved causes of obstruction. Horses, voracious feeders, are very apt in their avidity to bolt their corn whole, and gulp it down so rapidly, that the successive portions, instead of passing into the stomach, accumulate within the gullet, and block

up its canal. Only a small collection, or else a large and extended one, may in this manner ensue before the animal feels or expresses uneasiness. All at once he leaves off feeding. Next, he makes every effort in his power to complete his imperfect swallow, and gulp down the cause of his distress. Should he not succeed, his throat and neck become, through his gulping and ineffectual exertions, spasmodically drawn up; and probably he gives every now and then a loud shriek, no less expressive of his own anguish than excitivive of the compassion of those around him. Should he attempt to swallow water, the fluid, together with the saliva abounding in his mouth, returns through his nostrils. There do occur cases, however, in which such notably characteristic signs are not met with, or, at least, are not present at the time we happen to be called in; and there may exist reasons on the part of those in attendance for concealing what has passed from us. The refusal of food, with symptoms of apparent sore throat, connected with circumstances of a suspicious nature, are enough to induce us to scrutinize the pharynx and esophagus well with our fingers, in order to descry any tumour or prominence that may exist; also, to give the animal water, with a view of ascertaining whether there be obstruction of any sort or not: if the fluid is ejected through the nose, we should be warranted in introducing a probang, than which, in case the obstructing body lie below the neck, we possess no other means so sure of discovering its seat, or any so ready of removing it, even in any situation. A probang, however, is an instrument in the possession of professional persons only, and one, even with them, that often happens to be at home when they want it abroad, and therefore is one they are frequently forced to seek a substitute for. A professional friend of mine has told me, he has on several occasions, when the obstruction has been in the throat, succeeded with the butt-end of a waggon whip. Cavalry people might have recourse to a rough-rider's whip. A stout cane of any sort might answer the purpose. In all cases no time is to be lost: water—often a great assistant—and the probang, are to be immediately had recourse to. For a very interesting paper on this subject, published in *The Veterinarian*, the profession are indebted to Mr. King, of Stanmore.

Mr. King observes, that choking is common among old horses whose grinders are imperfect, and whose keen appetites incite them to bolt their corn. He has seen the esophagus in this manner distended "almost from the stomach to the throat:" a case in which recovery is very rare. Mr. K.'s practice is to pour down fluids, and press and squeeze the esophagus, with a view of mingling the liquid introduced among the masses of corn; and this manipulation has occasionally succeeded.

The following case shews how much a practitioner may be led astray by false or imperfect accounts:—

Some years ago Mr. K. was called to a horse belonging to a coach proprietor. The owner said his horse "had a bad sore throat, and could not swallow." Mr. K. examined the throat and gullet, but, finding nothing, suspected nothing. The horse was blistered and drenched; but the liquids all returned without any effort being made to swallow them. The animal died: and, on examination, was found, within the thoracic portion of the esophagus, a ball composed of the ashes of tobacco, enveloped in double paper. At first, all knowledge concerning this discovery was stoutly denied; but afterwards a confession came, that the ball had been administered for worms. Had not such delusion been practised, the probang would have been used, and, Mr. K. thinks, have proved effectual.

Mr. King also observes, there is a notion abroad, new-laid eggs will improve the condition of horses; and the practice is, to administer them with the shell only starved in a few places: a practice that has in some instances been the means of choking the animal.

Mr. K. was once called to a horse with a reported "sore throat." The groom *swore* he knew no cause for it. Mr. K., however, had reasons for entertaining doubts of the man's veracity; and therefore proceeded at once to pass a probang. On the return of the instrument, the bulb was found covered with fragments of egg-shell. The horse speedily recovered. Mr. K. has had related to him, on good authority, two similar cases in cattle practice.

The following irremediable and fatal case of the same description occurred to Mr. T. Cooper, V.S., Coleshill.

In December, 1834, Mr. C. was called to Dunton Hall, to a bay horse that was taken suddenly unwell. Mr. C. found the animal "coughing violently, and stamping with his fore feet; with saliva running from his mouth, which he occasionally attempted to swallow, but the greater part returned through his

nostrils." It was evident there was obstruction. The horse had been eating Swedish turnips. Mr. C. passed a whalebone down the esophagus, "and a rounded substance could be distinctly seen driven before it. The horse after this appeared to be relieved: he ate some hay and drank some water, and was left for the night." Next day he is much worse. He does not cough, but heaves very much at the flank; refuses all food and drink; is dejected; saliva with mucus runs from his nose, and much of it he swallows. He was bled; took an aperient with digitalis; and his throat was blistered, from a notion that "the substance might have injured his throat." Third day: much the same. "Takes gruel from a bottle, but will not eat." Mr. C. from the first had no hope of saving him, and early next morning he died. On dissection, a large sized hen's egg, entirely whole, was found firmly impacted in the esophagus, within a few inches of its cardiac termination; the parietes of the tube around the egg being "much dilated, and ulcerated nearly through." The groom confessed he had given the egg a few hours before Mr. C. was sent for, with a view of improving the horse's condition. The balls which had been given must have passed the egg in a liquid state, probably along with the gruel.—*Veterinarian*, 1835.

In *The Veterinarian* for 1839, Mr. George Holmes, V.S., Thirsk, Yorkshire, has detailed a case of much interest, no less from its pressingly dangerous tendency than from the prompt and judicious manner in which he treated it.

Mr. H. was sent for in great haste to Ashbury House, to a horse in a most distressing state, "breathing with the greatest difficulty, heaving violently at the flanks, and the countenance exhibiting an expression of the intensest agony. He was foaming at the mouth, ears cold, and, in fact, it was evident that, unless instant relief was afforded, he must die; for a ball had been given a little while before which had stuck in his throat." Mr. H. could detect no ball in the esophagus: he was convinced it was in the fauces, or pressing against the larynx; but the violent heaving, and the instant suffocation that threatened when he was moved, precluded any attempt to pass the probang. Mr. H. therefore determined on immediate tracheotomy. This gave instant, but very far from permanent relief. After a short interval Mr. H. endeavoured to pass the probang, and, after repeated attempts, succeeded in removing the ball. The horse was then bled, and had an aperient ball. Still he breathed high, and his pulse was 100: he was, therefore, bled again, and took two scruples of opium, with the same quantity of digitalis: this admirably allayed the irritation. Fifteen hours after, all was going on well.

These occurrences are exceeding rare in army practice. I can charge my memory but with one such a case; and that origin-

ated in some one having clandestinely given the horse an entire potatoe to eat. I attribute this exemption to three causes. First, to cavalry horses being fed four times a-day, and not being allowed above a quartern of oats at a time. Secondly, to no roots or hard substances whatever being given them for food. Thirdly, to the balls which are exhibited being such as are fresh compounded, and consequently not hard. The shape of the ball is also a consideration*.

I quite agree with Mr. King, that, in combination with the probang, the patent stomach-syringe should be employed in these cases, and no doubt might with very great service. The probang we use should be a perforable or tubular one, through which, when introduced, liquids might be injected without the trouble and loss of time of a fresh introduction.

ESOPHAGOTOMY.

WHEN the means detailed under the head of "Choking" prove ineffectual for the removal of the foreign body—whatever it may be—obstructing the canal of the esophagus, the operation of cutting into the tube, called *esophagotomy*, is our resource; unless it happen that the obstruction is below the neck, and then no knife can reach it. The same operation may likewise be practised with a view of overcoming impermeable stricture, or for the purpose of injecting medicinal or alimentary matters into the stomach when there is no possibility of introducing them through the mouth. In the hands of a veterinary anatomist there is nothing to dread in the performance of esophagotomy; although, from the esophagus lying behind the windpipe, much deeper seated, and there being the jugular veins and carotid arteries, and par vagum, and sympathetic and recurrent nerves, by the sides of the trachea, the scalpel requires to be handled with considerable caution as well as skill. Recollecting that the esophagus, after proceeding down one-third of the neck, inclines to the left of the trachea, and before it reaches the chest gets quite round to the left of that tube, had we our

* Vol. i, page 47.

choice, we should undoubtedly select the left side of the neck, and below the upper third of it, for the operation. Supposing we take the middle of the neck, our first incision—on which much of our ultimate success depends—should be three inches in length, and directed along the inferior border of the jugular vein; which vessel had better be kept distended the while by pressure from the hand of an assistant. The lips of the wound being kept apart by the assistant, the operator carefully prosecutes his dissection through the cellular tissue with which this hollow abounds, keeping his knife from wounding the jugular on his right, and guarding against the carotid artery and nerves which lie enveloped in the cellular substance contiguous to the windpipe, whose situation he will best ascertain by feeling for the pulsations of the artery. His object now is to get behind the carotid, and there feel for the windpipe; and this being found, will guide him to a firm, chordiform, shining, red substance, in close apposition with it, which is the esophagus. In case any injection into it be required, the esophagus must be drawn forward with a blunt hook, and opened by a longitudinal incision, and an appropriate tube introduced. But where the extraction of a foreign body is our object—a circumstance that will render the operation much more facile, the tumour being our guide for incision—nothing remains to be done after this exposition but to liberate the imprisoned substance, whatever it may be, and afterwards close the wound in the esophagus with a common continued suture of silk thread, and unite the lips of the external wound with pins and tow twisted round them, in the same manner as the wound after bleeding is closed. Lastly, a compress upon the wound, confined by a roller around the neck, will give support, and for a day or two, perhaps, be found serviceable. During the healing of the wound the animal's diet must be liquid, or nearly so: gruel, thick and nutritive, and boiled roots, and mashies of various liquid-like compositions: chopped green meat of any soft and succulent kind, and short-cut grass are also admissible.

The following case is well worth attention, on account of its shewing what may be sometimes effected by simple manipulation, without going to the extremity of laying open the esophagus.

Mr. King was summoned to a horse that had had a ball administered to him by the groom, wrapped up in writing paper; since which he had ejected every thing he had eaten or drunk. Mr. K. discovered a prominence in the neck, a little above its middle, and tried all means to force the obstructing body onwards, but without avail. At length Mr. K. determined on cutting down upon the esophagus; having done which—without opening the tube—he found the obstruction evidently arose from the lodgment of the ball the groom had given. Feeling the tumour soft and compressible, he squeezed and kneaded it with his fingers and thumb for some time; after which he left it *in statu quo*. Shortly afterwards the ball was by natural efforts carried down into the stomach, and liquids were taken and easily passed. It was not for some time, however, that the animal became enabled to take solids into his stomach: whenever he swallowed them they were rejected through the mouth and nose the moment they had descended as low as the place where the ball had stopped. Mr. King thought that this must have been owing to the presence of a stricture—an opinion he conceived warrantable from the circumstances of the ball being in itself but a small one, and of soft composition, and incapable of being stirred by the probang; and I think I may add, that this opinion has from Mr. Cheetham's case received additional probability.

SECTION X.

DISEASES OF THE STOMACH.

GORGED STOMACH, OR STOMACH-	GASTRITIS
STAGGERS	MINERAL POISONS
TYMPANY, OR WIND-COLIC	BOTS
RUPTURE	CONCRETIONS
INDIGESTION	POLYPUS.

PRELIMINARY OBSERVATIONS.

PLAIN and simple and little varied as the diet of the horse is, even in his domesticated state, one would think that his stomach could hardly experience disorder; and, in point of fact, from the *quality* of his food, in our country at least, it rarely does. But the stomach is liable to great abuse from the *quantity* of aliment introduced: the domiciled animal being, so far, very much under the will and caprice of his master. The stomach of the horse, in comparison with the bulk of other viscera and his body altogether, is remarkably small; the principal design of which appears to be, that it might not be capable of containing such a volume of alimentary matter as would, by its pressure against the diaphragm, prove an impediment to respiration, and thus render the animal either short-breathed, or physically incapacitated from sustaining exertion on a full stomach. The late Professor Coleman was wont, with truth, to observe, that the horse is the only animal that can or will exert himself after a full meal: the dog that has been just fed will not hunt; a man is indisposed for work after dinner; but as for the horse, he often appears livelier after having consumed a quantity of food than he was before; and, whether he be in reality in a better or worse condition for work, leaves his stable not only with willingness, but even with alacrity and cheerfulness. One appa-

rent, if not the principal, reason for which is, I repeat, that he possesses a *small* stomach.

Since, then, the horse's stomach contains less, it is only reasonable to suppose that it will require to be filled oftener than the stomach of other animals. If a dog is fed once, or at most twice, within the twenty-four hours, he thrives and is satisfied. But a horse is not satisfied, nor will he thrive or do well, unless he be feeding three parts of his time. A horse at grass is seen constantly grazing; the cow and the sheep at intervals lie down for hours together to ruminate; but the horse, not a ruminating animal, seldom, if ever, is seen lying—almost always pasturing: not ceasing when he has filled his stomach, like a man or a dog, but continuing to feed all day long. In the stable it is usual to feed a horse three or four times a-day with corn, and twice or thrice with hay or rack-meat: the corn he speedily consumes, but the hay occupies him many hours; and unless he have sufficient to engage most of his time, he is very likely to set about eating his litter. For, however nutritious his food may be, we learn by experience that *quality* will not prove a substitute for *quantity*.

By the laws of physiology, we cannot on a sudden change the natural habits of an animal, or even of any one of his constituent organs, for fresh ones, without the risk of entailing disease on that animal or organ; although we may by degrees introduce alterations, which become so confirmed by time and usage, as in their turn to constitute in effect the ordinary and natural habits. "Habit is second nature," and, long continued, will usurp the place of nature itself; on which principle alone can we account for the general healthiness of the horse's stomach, knowing, as we do, how much his natural inclinations are altered by art. How often do we see horses—hunters especially—taken to work at eight or nine o'clock in the morning, and not returned to their stables before five, six, or seven o'clock at night; and yet how rarely is it that we hear of ill consequences from all this. I believe, myself, that well-bred horses will endure long fasting and subsequent repletion with more impunity than coarse-bred ones and cart-horses; at least, many instances have come to my knowledge of stomach-staggers occurring in the latter, but very few in the former.

GORGED STOMACH, OR STOMACH STAGGERS.

BY "gorged" is meant that state of excessive fulness in which the stomach loses all power of contracting upon its contents. We have no evidence that the stomach sustains any hurt from long fasting; but from subsequent repletion it is liable to be put into a condition of the greatest danger: on which account it behoves us to be cautious how we feed horses who have gone long without food and returned home with ravenous appetites. Instead of filling their mangers with corn and chaff, and other provender capable of being bolted whole, we should give them but a very moderate allowance of manger-meat, and rather endeavour to appease their inordinate appetites by hay and food that requires a degree of mastication, so as to afford the stomach time for performing its duty in digestion and ridding itself of part of its contents, before sufficient be swallowed to distend it beyond its powers. For, as Gibson has truly enough observed, if a man over-fills his stomach, he has a chance of relieving himself by vomiting, and so "getting rid of his enemy,"—an alternative more prompt and facile still in a dog; but, as for a horse, who has "no natural disposition to vomit," the only chance he has of relief is "passage downward." An instructive account of the effects of fasting and subsequent repletion used to be given by Professor Coleman in his lectures.

The Professor was consulted about some horses, among whom had occurred a strange and unaccountable fatality. On inquiry, he found that the custom of the establishment was, to keep their horses out at work for ten hours together without food, and to feed them in abundance on their return home. The source of the evil became manifest. The Professor ordered, for the time to come, that the horses should be fed once in the course of the time they were out, by means of nose-bags; a practice which immediately put to flight a malady that had proved the death of several of them.

The same disorder has often made its appearance in breweries whose horses were kept out many hours without food, and on return to their stables too abundantly supplied with corn and chaff, or roots, or other manger-meat. The conductors of such establish-

ments, however, are grown wiser in this respect. Nowadays, it is seldom we see drays going out without carrying with them feeds for their horses in nose-bags. Such cases are of most rare occurrence in the army. Why are they so? Simply because cavalry feed their horses, in stables, four times a-day; and when on duty are always furnished with nose-bags or small corn sacks; which, in fact, constitute part of a dragoon's kit.

SYMPTOMS.—A stomach surcharged with food, without any accompanying tympanitic distention, does not appear to occasion any local pain, but operates that kind of influence upon the brain which gives rise to symptoms, not stomachic, but cerebral: hence the analogy between this disease and staggers, and hence the appellation for it of "*stomach staggers*." The unnaturally filled stomach produces for the first time a sense of satiety: the horse grows heavy and drowsy, reposes his head upon the manger, falls asleep, and makes a stertorous noise. All at once he rouses from his lethargy, and violently thrusts his head against the rack or wall of the stable, or any thing, in fact, that happens to oppose him, and in this posture paws with his fore feet, or performs the same action with them as he would were he trotting; evidently all the while unconscious of what he is about. His eye, which at first was full of drowsiness, has now acquired a wild unmeaning stare, or has already become dilated and insensible to light. The respiration is tardy and oppressed: the pulse slow and sluggish. The excretions commonly diminished.

THE DIAGNOSIS must be carefully sought after, by making every inquiry into the *history* of the case: knowing that similar symptoms may proceed from an affection of the brain itself, it is only in this manner that we are likely to fix upon the true seat of disease. The circumstance of the horse having gone long without food and afterwards received an abundant supply; or of his being so situated that he has had an opportunity of glutting himself, and, being a voracious feeder, would be sure to do it—such circumstances as these, I say, must be our chief guides in forming a correct diagnosis.

THE PROGNOSIS offers but little hope. Unless we can hit upon and put into immediate practice some operation for relieving the

stomach of its load, fermentation will take place, gaseous distention follow, and rupture terminate the case.

THE TREATMENT must be based upon this. What means have we of relieving the stomach? Can we vomit the horse? Not, I am afraid, with much certainty or effect; and yet, perhaps, under such pressing danger, we are warranted in making the experiment. The stomach of the horse has been known to relieve itself in this way; although its contents have been thrown into the chambers of the nose, and there endangered life by suffocation; and therefore, I repeat, in such a case as this, the experiment appears warrantable, and perhaps an infusion of hellebore root is the most likely medicine to excite it. There is, however, yet another mode of attempting to accomplish the same end, and that is, by endeavouring to pass a hollow elastic tube down the esophagus and into the stomach, and through it, by means of the stomach-pump, injecting a quantity of tepid water. On account of the state of the brain, it is advisable also to draw blood: and we shall assist the bowels in unloading themselves by the administration of copious clysters.

TYMPANY OF THE STOMACH, OR WIND-COLIC.

THIS is a disease in which the stomach or intestines, or both, become highly distended with air; or, at least, in which gas, in addition to any alimentary matters they may contain, is the principal cause of distention. In cows, this inflated condition of the *rumen* or paunch it is that constitutes the disorder in them called *hove* or *hoven* or *blown*; the ordinary cause of which is overloading the paunch with young, succulent, growing herbage, in particular, clover, by whose subsequent fermentation gas is liberated in such volumes that the animal's body becomes swollen to a most enormous size. In the horse, however, who has no *rumen*, veritable hove is a rare occurrence; though it is by no means uncommon to find him the subject of tympany or wind-colic. I never, probably, shall see again so many blown or hoven horses as I witnessed in the march of the British army from Waterloo to Paris, in 1815. A brigade of horses had been allowed to feed in a field

of growing wheat, and the consequences were, that several among them swelled in body, and turned almost frantic with pain, and died. In the stable, tympany is of rare occurrence; unless it be in crib-biters, who are suffered to pass their time in sucking in air; and in them the complaint is common enough. Such horses will gulp down air until their bodies become swollen in the same manner as those of hoven cows, though seldom to the same extent; they will then, from experiencing some uneasiness, begin to paw and strike with their fore feet, and lie down and roll and rise again, as if they were suffering from gripes. Their complaint is manifest enough, and rarely requires any thing beyond a good smart trot; the effect of which is, the expulsion of much wind, and more or less dung with it, *per anum*. Cases, however, have occurred to me, the subjects of which were not crib-biters, and yet there was that degree of virulence and obstinacy in their symptoms which appeared to warrant the opinion, that there existed something beyond ordinary spasms or gripes, whereto the symptoms were in all other respects similar. One of these I will here relate:—

A young mare was admitted, Sept. 1824, into the Royal Horse Infirmary at Woolwich, for “gripes.” A gallon of blood had been abstracted prior to her admission. The symptoms were of the most violent and alarming description. She sweated profusely from paroxysms of agonizing pain, worked hard and quick at the flanks, and had a thready and almost imperceptible pulse. The following drench was prescribed to be given immediately:—Tinct. opii et ol. terebinth. āā. ʒiij. decoct. aloës ʒvj. M. In the course of half an hour this was repeated: but shortly after she vomited the greater part of it by the mouth and nostrils. No relief having been obtained, fʒxii of blood were taken from her, and this drink given. Tinct. opii ʒiv. decoct. aloës ʒxij, ol. carui ʒss. M., a stimulating embrocation rubbed upon the belly, and large and frequent clysters injected. In another hour this drench was repeated; and, for the fourth time, during the succeeding hour; both of which, before death, she rejected as she had done the second drink. Notwithstanding these active measures were promptly taken, she died about three hours after her admission. Having opened her, we found the stomach prodigiously distended with air; it was, at least, three times its ordinary size. When punctured, it subsided to about two-thirds of its former bulk. It contained masticated oats and hay, swimming in a greenish yellow fluid, and emitted an offensive odour.

The extraordinary degree of suffering manifested in these cases; their resistance of all ordinary remedies; combined with some perceptible enlargement of the belly, and its evident tympanitic appearance and resonance on percussion; with eructations and vomiting; may serve to distinguish them from spasmodic colic or gripes. And, supposing we have been enabled to do so, then comes the question, what is to be done by way of

TREATMENT.—Medicine does not seem to offer any thing in the shape of a remedy: the most potent antispasmodics, and stimulants, and purges, I have given with no avail. Would the introduction of the esophagus-tube into the stomach prove practicable, and turn out of any service? Would the practitioner be justified in plunging a trocar into the abdomen, the same as is done to cattle, though the cases, or at least the subjects, are totally different? Three French veterinarians—Barrier, Herouard, and Farfouillon—are said to have performed this operation, and with success. The place they chose for puncture was the middle of the right flank, thereabouts being the region of the cæcum and colon; though in one case the left side also was penetrated. Should the stomach alone prove the seat of this disorder, it is obvious that the operation so practised must fail. The question in that case would be, can we reach the stomach itself with a trocar; and, if that be practicable, how far would it be safe to puncture it? One French veterinarian proposes we should make use of a curved trocar of extraordinary length for the purpose.

Should the practitioner determine on such an operation—and certainly the case of tympany, unrelievable by other means, appears to justify such determination—I would counsel him not only to employ a trocar longer than is used in the case of hydrothorax, but likewise of smaller caliber, and to endeavour at the part he perforates to draw aside the skin so as to make his opening a valvular one.

Since these observations were penned, the operation of trocaring the abdomen has been practised on our own side of the water by Mr. Stewart, Andersonian Veterinary Professor, Glasgow. In a mare, whose case resembled gripes, and in whom there was much swelling of the belly and poignant pain, which medicine and other means had failed in relieving, Mr. S. thrust a hy-

drocele trocar into the middle of the right flank. A large quantity of air escaped, and the intestine was soon emptied. Although so much air escaped, however, the abdomen did not appear to have diminished. Mr. S. then made another puncture lower down, into the cæcum—it might be the colon, for in these cases the bowels never occupy their ordinary relative position. He was guided in his choice of a place by percussion. Upon withdrawing the perforator, the air rushed through the canula with great rapidity and noise. The mare hastened its expulsion by frequently straining. The canula, as the stream diminished in force, was several times plugged up by the stercoraceous matter, which was removed by a probe: at last, a few drops of fluid came. The belly appeared reduced to its natural volume, and was quite flaccid after the operation. The mare lay for nearly three hours without a struggle. Mr. S. sat up with her, having resolved to puncture again should it become necessary, and to introduce some hydrocyanic acid through the canula into the intestine. From this she continued going on well. On the third day afterwards she had a mild cathartic, and was dismissed to her own stable.—*Veterinarian for 1836.*

The mare continued doing well for ten or fourteen days. Subsequently she ceased to improve, and the groom complained she would not suffer pressure on the right flank. When examined, tenderness there was very apparent; but there was neither heat nor swelling. Neither stimulants nor a blister did any good. The mare remained thin, and weak, and dull. There was some mischief going on in the right flank; but whether from the trocar or through gaseous distention, must be left to conjecture. From the beginning of her illness the mare could not lie upon her right side; a fact Mr. S. mentioned in recording the case.

Mr. Stewart has made three other like experiments, from which he appears to be borne out in drawing the following inferences in regard to puncture of the belly:—

1st. That the operation of paracentesis abdominis is not likely to do any harm.

2dly. That when the small intestines are the seat of tympany, it is not likely to do any good. When much inflated, the small intestines change their relative position, and the gaseous pressure is such as to prevent an easy passage from one convolution to another. It is thus that the trocar empties only one convolution, and one convolution holds so little, that its evacuation can produce no relief.—*Vet. for 1839.*

RUPTURED STOMACH.

THIS may be regarded as the natural termination of the case, continuing unrelieved, of gorged or tympanitic stomach. Up to 1824, the year I published the second part of my *Veterinary Lec-*

tures, I had not seen a case of this lesion. Since then three have occurred in my own practice, and *The Veterinarian* has brought to light others.

THE CAUSE OF DISTENTION and consequent rupture may prove to be either *air* or *food*, or both. In a case which I did not see until after death, the horse was known to be an inveterate crib-biter; and the post-mortem appearances were such as to render it most probable that his stomach had burst through the ingurgitation of air. In another case surcharge with food had evidently produced the mischief. The horse—a trooper in the 1st Life Guards—naturally a ravenous feeder, had stood for eight-and-forty hours in the stable feeding upon hay and corn, and what litter he could pick up; and the consequence was, an attack, on the second night, of a fit of pain, giving rise to symptoms of gripes, which, the next morning, was succeeded by cold sweats and tremors of body, quick and small and ultimately imperceptible pulse, convulsions, death. The accident may happen at pasture, from the stomach becoming distended with grass, the same as is the case in hoven in cattle; of which an instance is related in *The Veterinarian* for 1834, by Mr. Firman Fuller, V.S., March. Another case is given in *The Veterinarian* for 1836, by Mr. Goodworth, V.S., Driffield, in which eating haws occasioned it.

COPIOUS DRAUGHTS OF WATER upon a full stomach may produce it: of this Dupuy mentions an instance in *The Journal Pratique* for 1835.

BLOWS, FALLS, or VIOLENT STRAINING, will be apt to occasion laceration when the stomach is full.

Mr. W. C. Spooner, V.S., Southampton, relates the case, in *The Veterinarian* for 1835, of a cart horse, who, after a hearty meal in the morning, was put to a waggon to go to Southampton. By the time he had got six miles, he appeared in much pain, and wanted to lie down. He was urged on three or four miles further, was then led into a stable, and had a drench given him; after which he was sent home behind the waggon. At this period Mr. S. saw him. There was a dark-coloured offensive fluid issuing from his nostrils; cold clammy sweat; pulsation wholly imperceptible. Every now and then he would stretch out his fore legs, lean backwards and downwards until his belly nearly touched the ground, and then rise up again with a groan, after which the fluid from his nostrils issued in increased quantity. In about twenty

minutes after (during which he continued vomiting through his nostrils) he died in the greatest agonies. The stomach was found extensively ruptured. The horse was a ravenous feeder, and his diet mostly consisted of dry bran, which, on mixing with the liquid in the stomach, no doubt increased in bulk, and caused the rupture.

HURTREL D'ARBOVAL gives the history of the case of a horse who, after making a full meal and drinking plentifully at a watering-place, happened to slip up upon his left side in returning to the stable, and, on recovering his legs, with great difficulty reached his stall.

Some time after he manifested symptoms of uneasiness and pain, stretching out his legs and arching his back; but appearing relieved by placing his fore limbs upon higher ground than his hind quarters. He was evidently experiencing great pain in his abdomen, and this appeared to be augmented by every movement he made, and by the least pressure of the hand upon the belly, which was perceptibly enlarged. Pulse slow and very small. At length convulsions ensued; his neck became curved, and his head inverted between his fore legs; the pulse imperceptible; the respiration stertorous; upon which death quickly followed. The intestines were found distended with gas, and in general inflamed, as well as the peritoneum; and effused into the abdominal cavity were twenty pints of liquid, with some alimentary matters; of which latter there were also some between the folds of the omentum. Pyloric portion of the stomach empty; within the other was food, enveloped in mucous secretion. At one inch from the pylorus, extending to the middle of the great curvature, was a rupture through all the coats, eight inches in length, with borders thickened and blackish. The other viscera presented nothing noticeable.

LAFOSSE has given it as his opinion, that most commonly rupture follows some antecedent disease, some chronic inflammation; of which the following cases are adduced, by Dupuy, by way of proof:—

An entire horse died after a few hours of suffering from stomach-staggers. The stomach exhibited a rupture around its great curvature, near the pylorus. The peritoneal coat was more extensively torn than the muscular; the muscular than the internal. The omentum retained the extravasated aliments, and looked like the stomach itself. Liquid was effused into the cavities of the abdomen and pelvis. In opening the body of another entire horse that died after violent convulsions, the rent was found in the right sac of the stomach, along the great curvature, and close to the pylorus; its borders were irregular and bloody; the aperture in the peritoneum was less extensive.

than in the other coats; several bowlsful of alimentary matters were taken out of the abdomen, of which some had reached the pelvis, and even the scrotum. A third, a harness horse, who died from stomach-staggers, presented the stomach torn in the same part as in the former case; added to which there was a rupture in the tendinous centre and left crus of the diaphragm. In opening an old mare, several pints of bloody effusion were found, in which floated alimentary matters, along with a detached shred of omentum. The right sac of the stomach shewed an elliptical rent, seven inches in length, and in a line with the great curvature. This horse, after having eaten voraciously, exhibited the symptoms of indigestion.

DUPUY has not confined himself, however, to the relation of these cases. He has shewn a desire to account for the accident occurring so frequently among horses. For it he mentions two causes—the increased friability of the tunics of the stomach under inflammation, and the practice of giving water after a full meal. The stomach not being made to hold more than twelve or thirteen quarts of fluid, if some two or three gallons of water be drunk after a full meal, the liquid imposes strain upon the coats, and the consequence is, rupture. M. Dupuy has observed, in a horse that died of colic, the peritoneal coat lacerated, as well as a portion of the muscular, while the internal coat remained entire, although, had the animal survived, that likewise would have given way. For the rupture always happening in the great curvature, M. Dupuy accounts by referring to the change of position the stomach undergoes in becoming distended, and to the circumstance of the great curvature being the part least supported after that change has taken place.

A PATHOGNOMONIC SYMPTOM of rupture in the alimentary canal is, according to Dupuy, the feeling, under the fingers, of repetitions of convulsive movements—*tremors*—in the inferior coccygeal muscles. “Observation,” adds D’Arboval, “must decide upon the value of this sign.” Also, says the latter, but little confidence can be placed in any pathognomonic founded upon “particular attitude” or mode of expressing suffering.

DIAGNOSTIC.—From the circumstance of the extravasated matters having, in some cases, found their way into the sheath of the horse, it has become a question with Dupuy, whether the case might not be mistaken for one of inguinal hernia. In doubt, he

recommends that manual examination for hernia should take place in the manner prescribed*. "It is something," adds D'Arboval, "to steer clear of error." But we have still to regret that we possess no certain diagnostic of a lesion which, being necessarily fatal, would put a stop—the case being once finally decided upon—to all remedial proceedings.

There exist two cogent reasons for wishing to be able to pronounce at once upon a case of ruptured stomach: the first is, the preservation, if not enhancement, of the medical attendant's reputation; the second, the saving of solicitude on his part, and annoyance on the part of his patient, of administering any thing under such hopeless circumstances. I remember the late Mr. John Field observing to me one day, that he never had witnessed a case of ruptured stomach without vomiting occurring prior to death, which he thought very remarkable. The trooper, however, of my regiment, who glutted himself with food over-night and died the following morning, did not exhibit this symptom: though very often present, it is not, therefore, one invariably found. The questions naturally arise here—Can vomiting take place *after* rupture? Would the rent stomach retain any power of ejection? Would ejection of the contents upward be produced by the abdominal muscles and diaphragm, without the aid of the stomach? I should very much doubt it. I should rather feel inclined to the opinion, that the act of vomiting should be taken as a proof of the entireness of the stomach. At all events, we may have rupture happen without vomiting; and, consequently, we must cease to regard that symptom as pathognomonic, though we may justly consider it, in company with others, as one throwing much light upon the nature of the case. Our guides, in the absence of any one infallible pathognomonic sign, must be—the history of the case; the subject of it; the circumstances attending it; the inflated or enlarged condition of the abdomen; the symptoms of colic or gripes ceasing and becoming succeeded by cold sweats and tremors; the pulse, from being quick and small and thready, growing still more frequent, and, at length, running down and becoming altogether imperceptible; the countenance denoting gloom

* Under "Hernia," which the reader can turn to.

and despondency of the heaviest character; with or without vomiting. I do not think that any peculiar or strange posture the animal may throw himself into in a fit of pain can be relied upon as worth much; and as for the agitation of the tail—which I suppose to be what Dupuy means by "*des mouvemens convulsifs des muscles coccygiens inférieurs*"—it is a symptom which so frequently portends extreme danger in other cases, that I should imagine no especial import can be attached to it here.

INDIGESTION.

THOUGH a word in everybody's mouth, *indigestion*, in a medical sense, is a phrase of such comprehensiveness that it will be necessary for me to explain, prior to entering on the subject, what meaning it is my wish to have attached to it. By some physiologists *digestion* is applied exclusively to the change which the food undergoes within the stomach; by others, it is extended to every subsequent change the aliment experiences in being reduced to its ultimate states of conversion, viz. *chyle* or nutritive matter, and *feces* or innutritive matter. In man, whose digestive organs are in some respects differently constructed from those of horses, there is much reason for regarding the stomach as *the grand agent of digestion*; but in the horse, who is a graminivorous animal, one that is almost always feeding, and whose food is for the most part of a nature that occupies a large volume, notwithstanding his stomach is in itself but small, that organ appears to do less towards the completion of the process, leaving much to be done after the alimentary matters have passed into the intestines. To say, therefore, that indigestion is owing to some fault in the stomach alone, is taking much too confined a view of it. Equally in error should we stand, were we to hold the stomach altogether faultless: the only rational, or, at least, practically useful view we can take of the subject, is an extended and comprehensive one; so that, by a thorough scrutiny into all the circumstances of the case, we may be able to fix on the organ or part whose faulty action is deranging the process, and defeating its salutary end in the animal economy.

The comparatively short time the aliment continues within the

stomach, and the much that remains to be performed to complete its digestion after its passage into the intestines, accounts for the latter being oftener the seat of indigestion than the former; though the stomach, as we have already seen, may, by being over-crammed with food or over-distended with air, become the seat of what may be regarded as the most dangerous of all kinds of indigestion. To exclude, however, these two states of stomach from our present inquiry, what I mean here by indigestion, is, the progress of food through the alimentary passages without its undergoing due conversion, or without the animal deriving that benefit from it which it was natural to expect.

THE SYMPTOMS OF INDIGESTION—*chronic*, as the French writers call this, in contradistinction to the epithets, *acute*, *gaseous*, and *vertiginous*, which they apply to the other kinds—though they clearly enough indicate that some one or other of the operations of digestion are faultily performed, are not in common such as will enable us to say in what precise part or organ the fault or defect lies. The horse does not thrive the same as other horses in the same stable, nor is he capable of the same work; though his appetite, so far from being impaired, may be even voracious. Often it is fastidious—good at one time, indifferent at another. Sometimes it is depraved: he will gnaw and even eat almost any thing within his reach—dirt or stones;—a brick wall, and particularly the plaster or mortar from it;—his crib or rack, &c. His coat has an unhealthy aspect; it is what is called *pen-feathered* and arid, and, perhaps, scurfy: nor is it shed at the usual season. He is also hide-bound. His dung has not the appearance it ought to have; it is either darker or lighter than is natural, has an offensive odour, and, when broken, crumbles to pieces, and appears to consist of lumps of loosely compacted chopped hay, mingled with many entire or imperfectly changed oats. In the stable, the horse is mostly inclined to be costive; but when taken to work or exercise is soon excited to purge.

THE SKIN will be certain to sympathize with this disordered state of the alimentary organs. The coat will evince this; and, besides, some eruptive or morbid action is likely to be set up, which we shall not get rid of until we have corrected the digestion.

Covered as every part of the skin of the animal is with hair, we have no very accurate accounts of what these eruptive or morbid actions, arising from indigestion, distinctly are; although the trite proceeding in practice of dispersing them by a dose of physic is as old as any part of our therapeutics: indeed, this is a subject on which we lack information.

THE ORDINARY SEAT OF INDIGESTION would appear to be within the villous membrane of the stomach, or else that which lines the intestinal canal; both these membranes furnishing secretions indispensably necessary for the due conversion of the food into alimentary and fæculent matters. Independently, however, of any derangement in these membranes, many and various other causes might be mentioned, sufficient of themselves to account for the incomplete performance of the digestive process. Mastication may not have been duly performed: the salivary secretion may be bad or defective: the liver may not have done its duty: the bile may be faulty in quality or quantity, or the pancreatic juice: or there may exist some derangement in the peristaltic action, and consequent irregularity in the stay or progress of the alimentary matters. In fine, I repeat, other causes may exist, although irritation, or inflammation, or disorder in some form or other of the membranous lining of the stomach and bowels, appears to be the ordinary one, and is that to which my observations in this place must be confined*.

THE ORDINARY SUBJECTS OF INDIGESTION are three, four, five-year-old horses, and especially such as have been reared in low, marshy, cold, poor pastures: the coarse, rank, sour kind of herbage they get seems to lay the foundation for disorder in their bowels, a tendency thereto being probably created by constant exposure to every severity of weather; the first impression being made upon the skin, and the bowels becoming affected afterwards through what is called sympathy. Commonly, by change of diet, and by being taken proper care of, with some aid from medicine, they outgrow this unhealthiness; though there are some to whom it would seem to cling for the remainder of their lives. But horses may experience indigestion while living in stables. Every now

* For further information, peruse the observations on Gastro-Enteritis.

and then, among an establishment of horses, one turns out unthriving and looking ill, without any complaint of his not feeding or even not doing his work: the animal is evidently out of health, and yet we are unable to detect any positive disease about him. We inquire, as far as we are able, into the state of his digestion, and we find every reason to believe that his ill looks and unhealthiness are attributable to the imperfect or disordered manner in which that function is carried on.

TREATMENT.—The ordinary mode of dealing with these cases is to administer two or three doses of physic, at intervals of a week or so. A preferable procedure to this, is the old one of dividing the ball into two doses, and giving them at intervals of three or four days: the bowels being, in many of these cases, in such a state of morbid susceptibility, that a full dose of purging mass is very apt to bring on a diarrhœa. Besides which, I have invariably found, that keeping up a very moderate discharge from the bowels is, in the end, productive of more benefit than giving full doses of physic. When scouring is actually present, without any medicine having been given, or in a case where ever so little aloes induces it, I have seen much good effected by administering *hydrarg. c. creta* in doses of a quarter ounce once or twice a-day, made into a ball with common treacle. Cases in which, on the contrary, costiveness is a prominent symptom—there appearing to be a deficiency of bile—are benefitted by the exhibition of a scruple of calomel once a-day, either in combination with a drachm or a drachm and a half of purging mass, or else followed up by a dose of physic.

CHANGE OF DIET will often much assist in the restoration of healthy digestive functions. When green meat can be procured, soiling in the stable will be advisable; though in mild weather, and when flies are not troublesome, a run at grass is to be preferred: breathing the open air all day long, with the moderate exercise the animal takes of his own accord, being both very conducive to his health. In the winter season, carrots are given with advantage: Swedish turnips are also recommendable: bruised or scalded oats may be tried. When simply the mastication is found faulty, mingling the oats with chaff often proves a preventive. Linseed and malt may be given in mash, or the latter may be made into tea; or hay-tea may be offered; though the horse is not likely to drink

either of them voluntarily, unless he have been kept short of water. Drink should in all cases be given to the full the animal will take: better still, if the pail be so placed that he can help himself. All this, however, comes within the proper province of HORSE DIATETICS,—a subject into which inquiries upon a large scale must ever prove of the greatest service, at the same time that they cannot fail to be productive of considerable interest and satisfaction to the experimentalist.

GASTRITIS.

GASTRITIS or inflammation of the stomach is a disease which in the horse very rarely comes under the veterinarian's notice. Not that it so rarely occurs; for every practitioner who has been in the habit of inspecting the stomachs of horses after death well knows, that nothing is more common than to find the vascular gastric membrane reddened; but then, since medicaments of an irritating nature have mostly been administered, it is but natural, unless any very evident cause should exist for a contrary opinion, to refer this inflammatory appearance to medicine. I am so far from denying the existence of even idiopathic gastritis, at least in a chronic form, that I think it not at all unlikely that it may have much to do with indigestion, and, perhaps, some other cases about which we are at present equally in the dark*. Admitting, however, that it has a claim in the spontaneous or self-originating form to be numbered among our disorders, we are in possession of no sure signs to lead to its detection; at least, I do not pretend to know of any. We appear to pronounce with certainty upon gastritis only in those cases in which its presence is manifestly attributable either to chemical or mechanical irritation; and even in these we are commonly led to the seat of the complaint rather by circumstantial information than any pathognomonic we are able to glean out of the symptoms.

BY CHEMICAL IRRITATION I mean the irritation and consequent inflammation caused by substances, some vegetal, more mineral, given either in an improper form or undue quantity; many of which, sufficiently diluted or reduced, we are in the habit of administering

* Peruse the account of Gastro-Enteritis.

medicinally ; though even in their medicinal forms are they very apt to leave marks of congestion, often amounting to inflammation, upon the villous lining of the stomach. The aloes composing a common dose of physic does this ; hence arises the nausea and loathing of food. Hellebore, blue vitriol, corrosive sublimate, arsenic, verdigrease, &c., take a similar but more potent effect. When any such substances as these are introduced into the stomach in excess, either as regards their quantity or strength, and in consequence produce a degree of local inflammation sufficient to cause pain and arouse fever in the system, we denominate the substance a *poison*, and feel not more desirous to investigate the seat of the disorder than to make some discrimination in the symptoms characteristic of different poisons, in order that we may thereby be able to judge which kind or one of them has been exhibited.

THE SYMPTOMS occasioned by the introduction to excess of any of the metallic salts in common use, the mineral acids, or caustic alkalies, will vary with the quantity and strength of the poison, but will not be much altered—so far as these three classes are concerned—by its kind. The symptoms most remarkable from the presence of blue vitriol, corrosive sublimate, or arsenic, in the stomach, are—nausea and loathing of food, often accompanied by a discharge of saliva from the mouth. The horse paws ; turns his head round, and throws a look of extreme distress at his flank ; lies down ; rolls about the stall ; rises again in great agony ; heaves quickly and painfully at the flanks ; and finally breaks out into a profuse perspiration. The pulse at first is simply accelerated ; after a time it becomes contracted to a thread ; at length, altogether imperceptible. Prostration of strength now supervenes : the animal reels about in attempting to walk. His bowels become either violently purged, or else he is troubled with painful tenesmus, and voids nothing but mucus. At last, from continual torment, the poor sufferer turns delirious, throwing himself about in such a terrific and heedless manner in his stall that no one durst approach him, and in one of his truly horrible and perilous precipitations, casting forth a ghastly look, suddenly stretches out his limbs and dies.

THE POST-MORTEM APPEARANCES, in cases of death from the

mineral poisons before mentioned, are as follow:—The villous membrane of the stomach exhibits a patchy intense inflammation: red or purple or black spots—depending on this intensity—are apparent upon its surface; it is thickened in substance, perhaps coated with flakes of coagulable lymph; it may be in places ulcerated; it may be gangrenous. The cuticular portion of the stomach, though not capable of any vital action in itself, is chemically acted on at times by the causticity of the poison, and then exhibits black eschars.

In regard to ulceration of the stomach, that excellent surgeon, Mr. Abernethy, used to observe, how curious it was, though all the coats were perforated, yet did not the contents escape. For, as the ulceration proceeded from within outwards, the peritoneal tunic became inflamed, and contracted adhesion either with the contiguous bowel or else with the walls of the abdominal cavity, by which adhesion the aperture in the stomach became closed.

The intestines likewise suffer from these poisons. The small, and, in some cases, the large guts shew marks of violent inflammation in various parts. When arsenic has been given, the cæcum and colon are not infrequently discovered to be black and rotten—to be, in fact, gangrenous in places. One of the best tests, however, of the presence of arsenic in the bowels is the extremely offensive fœtor perceptible the moment the gas is let out: there is something so peculiar in this odour, that, once perceived, it can hardly ever afterwards be mistaken.

TREATMENT.—Were the horse, like a dog or a man, able to vomit, no sooner would any poison possessing emetic properties become swallowed than it would become rejected. Unfortunately for our patient this is a benefit he cannot receive. What then is to be done? Undoubtedly, in the present state of science, the immediate introduction of the stomach-tube into the stomach, through which, as quickly as possible, warm water should be injected and withdrawn until we have completely washed out the stomach. This follow up by throwing in some bland mucilaginous fluid—starch-water, water-gruel, arrow-root infusion, or any such composition that could be at the moment got ready—and then withdraw the tube. Afterwards, the horse ought to be drenched from time to time with copious draughts of water-gruel. Though, if the

practitioner happen to know what poison it is the horse has taken, he may bethink himself of administering some antidote after he has done all he can with the stomach-pump. In the case of corrosive sublimate, Orfila recommends albumen or the whites of eggs: these may be given in the gruel. In regard to arsenic, it does not appear that any thing can be given that will render it innocuous. To neutralize blue vitriol give also albumen, or a solution of soap. Should gastritis and fever result, in addition to all that is to be done locally for the stomach, we must bleed largely; perhaps apply a blister over the surface of the belly; and never fail to administer frequently copious clysters, with the intention of promoting a free discharge from the bowels. If I ventured to give any purge at all, I would administer a pint and a half of the common or second olive oil. Castor and linseed oils are both more or less dangerous in their operation. Aloes, drastic and irritative as we know them to be, appear on that account hardly to be admissible.

MECHANICAL IRRITATION may produce gastritis; though there is not half the apprehension of its doing so that people in common entertain. For whatever food the horse consumes of an asperous or prickly nature, is not only first well broken and ground by the teeth, but subsequently becomes triturated within the insensible cuticular portion of the stomach, before it is suffered to come in contact with the sensitive part, and thus, in a measure, is rendered mechanically innocuous. However, it may and does happen on occasions that, either from imperfect mastication or trituration, irritating substances do gain admission into the vascular compartment of the stomach, and then are very likely to excite an attack of gastritis. The following account is extracted from some cases transmitted to *The Veterinarian* for 1838, by N. B. :—

Mr. B. (Bean?) during the autumn of 1826, was called to six cases of gastritis occasioned by the horses eating haws from the thorns in the hedge-rows. The symptoms were similar in them all. Pulse thready, and scarcely perceptible; extremities cold; skin covered with dewy perspiration; respiration remarkably quiet. At intervals large quantities of fluid ejected from the stomach, having a peculiar acid odour: medicine in the fluid form was similarly discharged. Bleeding and medicine proved of no avail: the animal died six or eight hours after Mr. B. was called in. Patches of inflammation appeared upon the duodenum. The stomach and omentum had a purple appearance;

and when the former was laid open, a hard substance was found within, about the size of a goose-egg, composed of haws and fragments of thorns, and possessing a rough surface. The villous membrane presented evidence of the intensest inflammation, and around the pylorus various marks of laceration from the rough substance within. The years 1825-27 produced no such cases, a circumstance that has led Mr. B. to connect its occurrence in 1826 with the scarcity of after-grass that then existed, the horses being driven in consequence to browse on the hedges.

BOTS.

BOTS are the little grub-like creatures voided with the dung in considerable numbers by many horses during the autumnal season of the year, with the appearance of which all horse-people are perfectly familiar. These little animals are commonly regarded as and called *worms*: this, however, is a vulgar error of which we ought immediately to divest ourselves, and no longer look on them in any other than their true light—as the *larvæ* of the *æstrus* or gad-fly. For a very pleasing and instructive essay on the bot, from which I shall take the liberty to make some considerable extracts, the profession are indebted to Mr. Bracy Clark: in so doing, however, I strongly recommend the work itself to the perusal of every one desirous of investigating so interesting a subject.

Mr. Clark particularizes three species of bots: they are such, however, as are rather distinguishable from one another by incidents connected with their natural history than by any specific corporal characters. The first is the *æstrus equi*, or large spotted horse-bot, the most interesting of the three to us in this country; the second is the *æstrus hemorrhoidalis*, or fundament bot; the third Mr. C. has named the *æstrus veterinus*, or red bot. Speaking of the *æstrus equi*, Mr. C. says, “As it is necessary to break into the circle of its history at some point, I shall begin with an account of the egg, and its deposition upon the skin of the legs of the horse, which is done in the following remarkable manner:—When the female has been impregnated, and the eggs sufficiently matured, she seeks among the horses a subject for her purpose, and, approaching him on the wing, she carries her body nearly upright in the air, and her tail, which is lengthened for the purpose, curved inwards and upwards: in this way she approaches the part where she designs to deposit the egg; and, suspending herself for a few seconds before it, suddenly darts upon it, and leaves the egg adhering to the hair: she hardly appears to settle, but merely touches the hair with the egg held out on the projected

point of the abdomen. The egg is made to adhere by means of a glutinous liquor secreted with it. She then leaves the horse at a small distance, and prepares a second egg, and, poising herself before the part, deposits it in the same way. The liquor dries, and the egg becomes firmly glued to the hair: this is repeated by these flies till four or five hundred eggs are sometimes placed on one horse." The parts chosen for the deposition of these eggs are those liable to be licked by the tongue: the inside of the knee is a favourite spot, and next to this the side and back part of the shoulder, and less frequently the extreme ends of the hairs of the mane. Now, the common notion is, that the *ova* are licked off the skin, and thence carried into the stomach; but Mr. C. observes, "I do not find this to be the case, or at least only by accident; for when they have remained on the hair four or five days, they become ripe, after which time the slightest application of warmth and moisture is sufficient to bring forth in an instant the latent *larva*. At this time, if the tongue of the horse touches the egg, its *operculum* is thrown open, and a small active worm is produced, which readily adheres to the moist surface of the tongue, and is from thence conveyed with the food to the stomach." And it appears, that the irritations of the common flies is the instigation of the animal's licking himself; not, however, that this is absolutely necessary, for "a horse that has no *ova* deposited on him, may yet have bots, by performing the friendly office of licking another horse that has." The larva or worm, being hatched and lodged in the stomach, immediately clings, by means of its *tentacula*—two dark brown hooks, between which is its mouth—to the cuticular coat, which they pierce, though they never insinuate their points into the muscular or sensitive tunic beyond it: in this manner, so pertinaciously does the bot adhere, that, in our attempts to unhitch it, it will frequently suffer its hooks to be broken, or even its body severed, rather than quit its hold. Now and then, but I believe very rarely, they are found hooked in the villous coat; these, however, are nothing more than stragglers,—bots, probably, that had, on their arrival in the stomach, been hastily carried with the aliment into its vascular part, before they had the power of fixing their hooks into the cuticular. Here, then, is a fact which ought to stifle our apprehensions about the pain and irritation that these animals are said to occasion: how they can cause either, when they are fastened to an insensible part—to a part as devoid of feeling in itself as the very hoofs are—I have yet to learn. On one occasion I found more bots within the vascular than cuticular portion of the stomach, and a still greater number within the duodenum; and this happened in the month of January. I have repeatedly found them in the duodenum. However, I regard these as mere casual facts: their ordinary and natural nidus appearing to be the cuticular pouch of the stomach. Farther on, a case will be given in which they had made their way into the esophagus. The bot thus transported—about the latter part of the summer, while horses are at grass—remains in the stomach through the winter, until the end of the ensuing spring, when, being at the consummation of this stage or form of

existence, it spontaneously disengages itself, and passes with the chymous matters into the intestinal canal; where its stay probably is but short, since it now lies loose among the alimentary matters, and is eventually cast out from its animal abode with the dung.

Now, it has long been a question, and one which is not yet set at rest, on what these worms subsist in the stomach. Mr. C. supposes their food to be the chyme, which, (he says) being *nearly pure aliment*, affords probably but little excrementitious residue. I do not, however, believe that nearly pure aliment—what we understand by chyle—is found in the stomach, much less in the cuticular part of it, where, as far as I have observed, the food itself remains unchanged even into chyme. But, suppose they were surrounded by chymous, or even chylous matter, their mouths, instead of floating in it, are opposed to, if not in contact with, the lining membrane of the stomach, and, consequently, not conveniently placed for such imbibition: in fact, their mouths must be, I should imagine, enveloped and concealed by mucus, as abundance of that fluid is deposited upon the surface of the alimentary mass, to sheathe the stomach from mechanical irritation. For myself, I feel inclined to think that this mucus constitutes their food; and it is one, probably, that possesses little or no excrementitious matter, since it is itself re-absorbed in many parts of the body: but what favours this opinion is, that there are bots within the sinuses of the head, in the skin, &c. of cattle, which can have no other sustenance than the secretions of those parts, a fact that Mr. C. himself admits; and that worms in the intestines of animals are nourished in the same way, is rendered highly probable by the existence of the *ascaris* in the colon and rectum—cavities that contain little or nothing else but what is excrementitious.

About the month of June or July it is, that the bots, having left the stomach and been transported with the aliment through the windings of the intestinal tube, become discharged with the fæces; and at this period it is that people discover, for the first time, that their horses (particularly those that have been at grass the preceding autumn) have what they call “worms;” to get rid of which vermifuges all at once come into pressing requisition. If, however, these well-meaning people will have but a little patience, their imaginary plagues will soon quit the bowels of their horses of their own accord: the time being now arrived for them to take on other forms, and answer all the remaining ends of their nature. The larva, being ejected, lies not long exposed upon the ground, or concealed in dung, but quickly dries up and shrinks into the state of *chrysalis* or grub, in which torpid condition it continues for a few weeks. At the expiration of this time, “the superfluous moisture being removed, and the parts of the future insect being hardened by drying, it bursts from its confinement, and the fly appears making its exit at the small end.”—“On quitting their shell” (male and female) says Mr. C. “they in a few hours become dry, take wing, and then seek their mates. The female being impregnated,

searches for a proper subject among the horses, performs with great solicitude and care her office of depositing the eggs upon the legs of the horse, in the manner we have already stated, thus completing the wonderful round of its operations and history."

The insect of the *æstrus hemorrhoidalis* or *fundament bot*, whose manner of depositing eggs, says Mr. C., has never been described, or known before, chooses the lips of the horse for this purpose, "which is very distressing to the animal from the excessive titillation it occasions; for he immediately after rubs his mouth against the ground or his fore legs, or sometimes against a tree, with great emotion; till the animal at length finding this mode of defence insufficient, enraged he quits the spot, and endeavours to avoid it by galloping away to a distant part of the field; and if the fly still continue to follow and teaze him, his last resource is in the water, where the *æstrus* never is observed to pursue him. These flies appear sometimes to hide themselves in the grass, and as the horse stoops to graze they dart upon the mouth or lips, and are always observed to poise themselves during a few seconds in the air, while the egg is preparing on the extended point of the abdomen."—"The larva or grub of this species inhabits the stomach as the former, generally adhering to the white lining, and is disposed promiscuously in dense clusters after the same manner; they may, however, be distinguished from them *by being in general smaller, longer in proportion to their bulk, and rounder; and, I have thought, of a duller red, or more inclining to a white*, than those of the equi, for they differ in appearance in different subjects." These bots quit their habitation in the same season of the year, but are rendered remarkable by their "sticking more or less within the verge or opening of the anus, adhering to its soft lining, and producing considerable irritation. Indeed, I once well remember," continues Mr. C., "being on a tour of pleasure in the Isle of Wight, and experiencing much annoyance from these larvæ. The little horse I had hired for the journey became so lazy and unwilling to go on, and moved so awkwardly, that I could not keep pace with my company, and I was at a loss how to proceed; but on casually taking up the tail, I discovered three or four of these insects hanging to the rectum, and their removal instantly proved a cure." Its change to the chrysalis state, and further transformation into that of insect, which happens in about two months, is similar to what befalls the *æstrus equi*.

Of the *æstrus veterinus*, or *red bot*—so designated by Mr. C. in preference to retaining the epithet *nasalis*, which conveys a false notion of its habitation—the same historical detail does not appear to be made out; for our author commences his account of it by saying, "The mode of this insect depositing its eggs or nits is at present unknown. By watching for them on the commons in the warm days of the sixth and seventh months (July and August) it might be detected, I apprehend, without very great difficulty. They, perhaps, deposit them about the lips or legs, as the former species. The larva of this species is also not certainly known. That it inhabits the stomach, as the two

former species, there is little doubt; and I have taken considerable pains to search for it at the slaughter-houses, and have found a species in the stomach which widely differs from the *equi* and *hemorrhoidalis*, and which I presume may be the larva of this: though it is possible there may be a fourth species inhabiting the stomach of the horse, in which case it may be still doubtful, that I do not positively assert it to be this larva belonging to the *veterinus*."

"This larva, if it is the *veterinus*, may be known from the two preceding species, *being smaller, of a more tapering or oblong figure, and the segments more detached and rounded, shining, smooth, and of a pellucid red or ruby colour, more particularly at the tail or obtuse end.*"

After having described a fourth species, or what he apprehends to be so, from some peculiar characters it possesses, Mr. C. asserts that he once found the real chrysalis of the *veterinus* in the neighbourhood of Worcester, under some horse dung, a drawing of which he gives from memory.

SUMMARY.—The ovum, nit, or egg of the bot, then, it appears, being deposited some time in the autumn upon the hair, gets licked by the tongue, by the heat and moisture of which it is instantly hatched, and its larva liberated and absorbed. With the food the larva is conveyed into the stomach, where it fixes its residence for the winter, insinuating its tentacula into the cuticular coat. In the spring of the year it withdraws its hooks, descends from the stomach into the intestines, and is carried along with the alimentary mass to be expelled with the fæces. Its exposure in the dung is quickly followed by its desiccation and contraction into the state of chrysalis, from which, in about two months, it undergoes its last metamorphosis into the insect called a gad-fly.

We now come to the

PROBABLE EFFECTS OF BOTS UPON ANIMALS, a subject replete with interest, and one that presents a wide field for speculation, both to the physiologist and natural historian. By a train of reasoning, interspersed with some (that appear to me to be) singular notions, Mr. C. endeavours to shew that bots exert a salubrious influence in the stomach of the horse by promoting digestion, acting as what he calls *vellicatories*, like local stimulants and detractors, on the principle of counter-irritation. I cannot, however, acquiesce in these hypotheses, much less admit what this learned writer has adduced in support of them. That "children of cachectic habits breed worms faster than healthy children, which may

tend to suppress or moderate the disease they incline to," is an opinion that obtained with our predecessors in physic, but one which I should apprehend would find few or no advocates among the physicians of the present age; and that sheep in low damp situations, *by being infested with worms may be preserved from worse disease*, seems to me to be equally irreconcilable with the sound pathology of the day. What Linnæus taught, "that lice, by gnawing or irritating the skin of the head, excite a sort of running sores among boys kept in filthy work-houses, or confined places, and become strumous or swollen by the confinement, *by this excitement are preserved from coughs, wheezings, blindness, epilepsy, &c.*" might have been perfectly consistent with the medicine of his day; but that Mr. C. should repeat it to strengthen his opinions in this more enlightened age of medical science, I must say I feel some surprise. And when, in proceeding, I find it stated *that it will not be easy to discover how far the access of murrain in cattle, glanders, farcy, &c. in horses, may be prevented, and moon-blindness, inflammation of the lungs, spasms, splints, &c. in any degree checked or subdued by the presence of these local stimuli*—and in another place, *that his horse became fatter in consequence of having had administered to him about three dozen of bots' eggs, and that the nasal farcy gleets of horses were cured BY STIMULATION TO THE STOMACH, from the exhibition of two powerful astringents, cantharides and sulphate of zinc*, I must add, that I depart *toto cælo* from the views here taken of the effects, healthful or hurtful, of these little animals; and I venture to be the more explicit in my opinions of these remarks, as Mr. C. says he shall not be tenacious about the permanency of the foundation they may furnish materials for.

But let us inquire how the operations are to be conducted to which Mr. C. attributes such a variety and number of beneficial effects—how bots *can* promote digestion, and excite irritation and issue by vellication. We must not forget that bots are attached to a part of the stomach that does not perform any proper digestive function, and that all stimulants or other substances promotive of digestion must be applied to the *vascular* part, the only veritably digestive surface, or, it is obvious, they can have no such effect:

moreover, the cuticular portion of the stomach being *inorganic*, how can any thing like a determination of blood or issue be produced in *it*? Indeed, I do not see with Mr. C. how they can perform the office of *stimuli* at all, unless it be that, by some motion they are capable of, they may have any such influence upon the mucous follicles—placed in abundance under the cuticular coat; but then, again, we are not sure that this secretion is necessary to digestion! Thus far, however, we perfectly coincide in opinion—“that the perfect health they (horses) enjoy with them (bots) is proof sufficient of their innocuous nature and harmlessness in a general way.” Though I have heard Professor Coleman say, that he knew of one case where bots appeared to have destroyed life; for, after death, the coats of the stomach appeared eroded in places, as well as the diaphragm, and some of these animals had made their way into the cavity of the chest.

Hurtrel d'Arboval asserts, that, so long as bots exist but in small number, they do no harm and cause no pain; but in a multitude, they occasion sharp pains, and prove detrimental to digestion, by absorbing the greater part of the juices necessary for that operation. The following case proves that in numbers they are capable of doing a vast deal of mischief:—

Mr. Cartwright attended a mare who, from being removed in the autumn to pasture upon wet marshy land, and suffered to remain out until nearly Christmas, lost her flesh and strength. At length she became worn down to a skeleton, and, from debility, lost the use of her hind parts; in which state she was destroyed. The colon and cæcum contained liquid fæces, consisting principally of the soil and grit she had eaten. The lining membrane was in a state of approaching mortification. In the ileum were many flukes, resembling those found in rotten sheep. In the stomach were forty red bots, which had in places almost eaten through its coats. In the esophagus were two hundred large white bots, which in several places had eaten through and buried themselves under the cuticular coat: the tunic itself was altogether changed in colour and texture, and stank very much. There were about twenty pounds of soil in her intestines, which had evidently been picked up from that spread on the field.

Mr. Clark concludes his interesting account of the bots of horses with some observations on the most effectual mode of destroying them. He observes—and this observation should be imprinted

upon our mind—that, “ At the natural annual period of their transformation they come away readily enough of themselves; and if it happens at the time that any medicine has been exhibited, it is considered as proof enough of its efficacy, and mistaken for the consequence of it: so easy is it to draw wrong conclusions. Neither opium nor tobacco given for several days have any effect upon them, as I have witnessed by opening the stomach after the death of such, and finding them lively and well. We can, it is true, force the poison down the horse’s throat, but we cannot afterwards get it into the throat of the worm, who is placed in his own element, and can refuse the food that does not suit him. Truly is it therefore difficult to destroy them by means of poison thrown into the stomach.” “ The wisest measure,” continues our author, “ for securing animals from their effects is to prevent their propagation or access, and their habits expose to us an effectual mode of doing this. The eggs of the *œstrus equi*, which are very conspicuous on the knee, the mane, and the sides of the horse, may be washed off by a brush and warm water, or still more effectually removed by a pair of scissors. The same may be done for the *hemorrhoidalis* from the lips and beard.

“ The other species being smaller, more rare, and probably less troublesome, require therefore less our consideration.

“ In respect to the *hemorrhoidalis* also, where horses have been much out at grass the preceding year, they should occasionally in the warm months of the next summer be examined for them; when they will be found, as we have already stated, hanging to the extremity of the rectum, and should be removed by the fingers. The destruction of a single one at this season of the year is not only the death of an individual and its effects, but the almost certain destruction of a numerous progeny; it is also useful in preventing the irritation which the spines of the bot occasioned to the anus, which irritation becomes very distressing to the animal if he is used on the road, occasions him to move awkwardly, wriggle himself about, and to be sluggish, and though beaten severely he soon relapses again into his awkward manner of going; which, as this happens generally in warm weather, is most commonly attributed to mere laziness.”

It has been conjectured that bots might prove serviceable to the animal by aiding the cuticular coat in the trituration of the food.

That Nature should have created an animal, and designed it as an inhabitant of the stomach of another animal, without some good, but, I suspect, unknown end, I think, in unison with others, highly improbable—irreconcilable with her other beautiful and more-readily-explained operations: I am however, for my own part, I must confess, unable to draw up the curtain which is here interposed between fact and design.

Supposing that bots in some way or other do good rather than hurt, surely we cannot be solicitous about removing them; for, though we are unable to demonstrate their beneficial influence, we may, from all the circumstances we have arrived at a knowledge of concerning them, at least assert, *that they in general are not injurious*. Howbeit, we cannot persuade the world so; and therefore we must be prepared to meet the complaints of persons who come to us about June or July—and say that “their horses have *worms*, which must be got rid of—with a remedy for that purpose. Should any other malady exist at the time, no matter what, its origin will commonly be traced to the presence of these *mischievous vermin*. In all works on farriery we find some recipe extolled as a vermifuge; which, unless it contain a purgative ingredient, we may, sans hesitation, expunge as inefficacious: for we know of no medicine that has the power of *destroying* bots in the stomach, and, if we did, are we sure that, even when dead, they would become detached from its cuticular coat: though, if they lay in its vascular part, they would be subjected to the action of the gastric juice. No medicine therefore, not even a purge, can operate as an *æstrifuge** but at a certain season of the year; when, as I said before, if we will but suspend its exhibition for awhile, the bots will all readily pass away without our assistance. Supposing we are forced to prescribe something to expel them, we have no medicine so suitable as a common purge: a dose of aloes is all that is required, though it is usual to combine it with calomel, which will render it more expellent; and herein, I believe, resides all the (supposed) specific virtue of the latter medicine as a vermifuge.

* I introduce this term to make a distinction between vermifuges and *bot expellents*.

CONCRETIONS IN THE STOMACH.

"It is no uncommon circumstance for hard substances to be found within the stomachs of horses. I have seen several specimens. They were chiefly calcareous. The largest I ever saw was taken from a horse of my father's that died of old age, after having worked in a clay-mill for a number of years. I think this was nearly as large as an ostrich's egg, and not very dissimilar in appearance; it was of an argillaceous nature, and was, doubtless, formed of the fine dust of the clay which the horse was continually imbibing with his food. Its nucleus was the large end (about half) of an old nail. I believe they are always found to contain a nucleus." Thus much, on the subject before us, writes a correspondent, who signs himself J. F., of *The Hippiatrist* for 1830.

In *The Veterinarian* for 1837 is to be found the case of an Andalusian horse, reported by M. Blavette, V.S., who was, in addition to being a notorious crib-biter, *a depraved feeder*. "Neither manger nor rack, nor the fragments of the bars, escaped him: he gnawed his halter, and licked the walls, and ate up all the earth he could get at; and was a confirmed roarer." For many years he had been subject to violent colics, which became latterly more and more frequent. In one of these paroxysms, at last, he died. There was found in his stomach, after death, four pounds and a half of earth and sand. He had, as was learned afterwards, escaped from his groom on the morning of the day he died, and galloped to the riding-school, where he was found eating the earth and sand composing the floor. A brass wire, about the size of a knitting needle, and eight or nine inches long, was found sticking in the intestines, through whose walls it had penetrated and had run into the lumbar muscles.

POLYPUS IN THE STOMACH.

MR. Brown, V.S., Melton Mowbray, has a preparation of a polypus which was taken out of a horse's stomach.

The subject of it—an old brown horse, Sheffield—was found, early in the morning of the 1st of May, "labouring under an

attack of the bowels." The animal experienced great pain, cold sweats, quick pulse, &c. No veterinarian attended. Oily purges and frequent clysters were exhibited without giving relief. The horse died on the fifth day from the first attack. About fifteen inches in extent of "the first small gut were mortified."—"The stomach was full, but its contents were liquid, and at the lower extremity there was a pendulous substance, which was plugged into the gut, totally obstructing the passage. I am informed that the animal was a remarkably healthy one, and apparently suffered no inconvenience from the polypus, until it formed a mechanical obstruction to the pylorus. The pedicle is rather tortuous, with an artery and two veins in the centre, having an expanded origin, which becomes converged into a firm cord, one inch in diameter and three long, terminating obliquely in the body of the polypus, which is a firm flat substance, weighing seven ounces and a quarter."

SECTION XI.

DISEASES OF THE INTESTINES.

GASTRO-ENTERITIS	WORMS
COLIC OR GRIPE	DIARRHŒA
TYMPANY	DYSENTERY
ENTERITIS	HERNIA
VOLVULUS	INGUINAL HERNIA
INTUS-SUSCEPTION	UMBILICAL HERNIA
CALCULOUS CONCRETIONS	VENTRAL HERNIA
STERCORACEOUS COLLECTIONS	DIAPHRAGMATIC OR PHRENIC
RUPTURE	HERNIA.

THE intestines of the horse are more obnoxious to disorder than his stomach: they are much more voluminous; the part they have to perform in the process of digestion is more tedious; the aliment remains for a much longer time within their cavities, so that any thing hurtful it may contain has more opportunity of exerting its deleterious effects; added to which, from the extreme length, tortuosities, and irregularities in shape and volume of their canal, concretions are more liable to form within and obstruct their passages. Moreover, the intestines, in the execution of their functions, have entailed upon them a motion from place to place—one of a vermicular description—in the performance of which it occasionally happens that one of them gets twisted or tied in some indissoluble kind of knot, wherefrom obstruction and consequent loss of life are likely to ensue. Several of the intestinal diseases are of a nature highly acute, rapidly destructive, and require correspondent activity of treatment; others there are so insidious in their course, that, unless special attention be drawn to them, they will exist and depart without our knowledge; or they will run into a stage in which they are out of the power of medicine before our attention becomes attracted to them. In making these remarks, I feel I am

approaching the consideration of a disease which in our own country has had too little notice taken of it; while our professional brethren across the channel have ascribed an importance to it proportionate with the reputation of the physician who first obtained a place for it in human medicine,—the celebrated Broussais. Without going the length of this medical philosopher, who asserted that four-fifths of diseases consist in irritation of the intestinal mucous membrane, and that therein resides the essence of fever, we may, for some considerable way, accompany our fellows, the French veterinarians, and with them admit that it is a disorder that has been very much overlooked. To Girard, Dupuy, Bernard, and Leblanc, are veterinarians indebted for excellent accounts of this disease; and as these authors have been freely drafted from by D'Arboval, I shall take the liberty of transcribing from the work of the latter, in order that my reader may have the very best observations on the subject laid before him for his future consideration and guidance.

GASTRO-ENTERITIS.

IN animals affected with this disorder, the local phenomena of inflammation are unappreciable during life, in consequence of their inability to express any sense of the inward pain or heat they may and do assuredly feel. We can only suspect their existence by making pressure upon divers parts of the abdomen with more or less comparative force, and thus guess at the principal seat and extent of the inflammation. When the disorder sets in rapidly, it is indicated by dejection, dulness, slight anxiety, head dependent and heavy, and hanging in the manger; infiltration of the eyelids, which are half-closed; reddening with yellowness of the conjunctiva; tearful eyes; deep and jerking respiration. Soon the mucous membranes acquire the same hue as the conjunctive, and are at times infiltrated and tumefied. To these symptoms are joined, loss of appetite, often sudden; a dry, clammy, foul tongue, red at its upper part and around the borders; more or less thirst; stiffness of the spine and hind legs, with difficulty in moving and swelling of the latter, and staggering in the gait; weariness; alternate heats and chills about the ears. Pulse at the commencement full and strong and quick; afterwards small, hard, and thready. The belly becomes tense, but has rather a tucked-up than an inflated appearance. On some occasions the attack is so sudden that the horse, saddled or harnessed to go out, experiences all at once a remarkable heaving of the flanks, dilatation of the

nostrils, dependance or incurvation of the head, griping pains, partial tremors of the muscles of the shoulder and stifle, staggering, sometimes squatting upon the haunches or falling down, and reposing the head upon the ground. Most horses cannot lie down; many maintain the erect position evidently with pain: others fear to move lest they fall. The vital powers seem to concentrate themselves inwardly; the skin becomes insensible; the coat loses its gloss, and turns dry and pen-feathered; prostration supervenes; the discharges are rare and scanty; the dungballs small, dry, blackish, and coated; the urine, equally scanty, is at one time reddened, at another limpid and crude, and not expelled without effort. Most horses, during the height of their complaint, will at intervals grind their teeth; all experience considerable heat under the foretop, across the whole parietal region.

The horses most predisposed to sudden attacks of gastro-enteritis are, the young, vigorous, sanguineous, and irritable; in particular those over-well fed in proportion to their work.

Duration.—When rapid in its progress but simple in its form, presenting no other than symptoms of gastro-intestinal irritation and disordered digestion, with little or no sympathetic re-action, it takes five or six days to acquire its height. Debility then more undisguisedly shews itself; the tongue becomes greatly more loaded and fuliginous; the hind legs swell more, and the fore ones begin to fill; the hair comes out with the least traction: at certain times of the day some experience dysentery; in all there is an exacerbation towards evening.

The termination is by resolution, or by passing into the chronic form, or, after a sharp conflict, by death.

In another form, the symptoms, less intense, develop themselves and succeed one another more tardily; indeed, in most cases they are ushered in after the same manner as all the phlegmasiæ. Some days before the attack, the horse grows slack in going, insensibly loses his accustomed gaiety, has no longer the same appetite, feeds tardily, sweats easily, stales often; passes hard, black, shining dung. After this, his appetite grows worse; he seeks to refresh his mouth by licking any thing cold within his reach; he likes to plunge his nose into water, and as yet drinks freely: at length he refuses his corn and part of his hay, and prefers cold water; and begins not to lie down. In the beginning, the diagnosis is uncertain: it is only well characterized when the other symptoms have shewn themselves and confirmed the attack. The symptoms are better marked in the evening and during the night than in the morning or in the day: at these times, besides such as are seen in a rapid attack, we have rejection of all food; either a pressing thirst or else a refusal of drink; phlogosis; reddening of the conjunctive and pituitary membranes, whose vessels are injected. The pulse, at first full and hard, becomes feeble and accelerated. These symptoms often endure two or three days without any great accession: afterwards they daily appear more marked, and, when once they have acquired their greatest intensity, the de-

jection and heaviness becomes extreme; the heaving of the flanks hurried, gaping and grinding of teeth frequent; coat dull and on end; mane and tail easily plucked out. After a time the mucous membranes change their red for a livid tint, and emaciation ensues.

Complications.—With these phenomena become united, in both forms of the disease and in every case, more or less disorder of the functions of other organs. Divers phlegmonous complications make their appearance in other parts of the digestive apparatus and its dependencies—in the mucous membrane of the air-passages, in the brain, in the urinary passages, in the organs of generation, and even at times in the skin. The sur-excitation of the mucous membrane of the mouth may be regarded as sympathetic, for it increases or diminishes in the same ratio as the gastro-enteritic disorder itself does. According as the attack is sudden or protracted, this membrane is dry or clammy: the tongue rarely preserves its natural complexion and humidity; it has a more or less bright red aspect, particularly towards its point and border; its papillæ and mucous follicles are more or less developed; its surface, blanched, white or yellowish, is covered with a blackish epidermoid crust; the organ acquires volume and firmness, and exhibits sometimes along its under surface *phlyctenæ*, or else ulcerations more or less deep and extensive. In opening horses that have died, points of inflammation have been detected upon the pharynx and esophagus; sometimes even aphthæ are found at the bottom of the mouth: I have seen them in many horses. The large intestines are sometimes inflamed, and even on some occasions the margin of the anus may be observed to have grown red. The liver, with its peritoneal covering and excretory ducts, participate in this sur-excitation. Gastro-enteritis rarely exists in intensity for any time without re-acting upon the mucous membrane of the respiratory passages, producing that sympathetic phlegmasia which is known by a sort of râle, by a painful state of throat and upper part of the windpipe, by embarrassed respiration, by dilatation of the nostrils, by accelerated heavings of the flanks, by a short, dry, hollow cough, by shakings, and occasionally by a discharge from the nose of frothy mucous matter, sometimes, but rarely, yellowish. Inflammation of the lungs may also be a complication: then the expiration becomes more frequent, the respiration short and quick, the expired air hot, and the pulse strong. Peritonitis and nephritis may likewise prove complications. In the first case, the horse experiences abdominal pains and rubs his lips; in the second, there is inflexibility of the spine about the lumbar region, and the animal evinces pain when pressed over the kidneys: the urine is also redder and less in quantity. In fine, when gastro-enteritis is most intense, the consequent uneasiness and fatigue are often attributable to the brain; the derangement of which is indicated by the extended neck, the heat and heaviness about the head, the drooping attitude, the resting point that he makes of the manger, and the drowsiness he evinces. At the time the sight and hearing become affected, the conjunctiva looks red and injected; or it assumes a pur-

plish hue, which at the bottom often turns yellowish, and exhibits *phlyctenæ*; the eyeball is inflamed and the eye obscured; the muscles of the face are irregularly contracted; there is grinding of the teeth, often symptoms of vertigo, and sometimes to that degree that some veterinarians—among others, Dupuy—have regarded the gastro-enteritis of 1825 as a form of vertiginous affection. This combination is especially fatal, and quickly so, and particularly in old horses and such as are oppressed with work beyond their powers, or otherwise debilitated. Phlegmasiæ sympathetically developed in the urinary passages and organs of generation will account for the changes in the urine beforementioned, for the agitation of the tail, the frequent desire to stale, the erections of the penis of the stone-horse, the outstretching of the legs of the gelding, the reddening of the mucous membrane of the vulva of females, and the sense of heat in introducing the hand into the vagina. The skin will not prove exempt from becoming sur-excited, as will be evinced by its elevation of temperature, its state of dryness or sweat, the slight adherence of the hair, its dull and rough aspect; and, moreover, in some epidemics, by the buttony eruptions manifest upon it. At the last, swellings rise upon the hind legs or hocks; œdema appears upon the belly, sheath, and breast; the scrotum becomes covered with a dried matter in place of the natural unctuous secretion; or else phlegmonous tumours form upon divers parts of the body: some we have observed upon the parotids and breast.

Autopsies.—Post-mortem inspections have shewn different and various diseases according as gastro-enteritis has set in more or less suddenly, been slow or rapid in its course, and more or less complicated with the inflammation of some viscus or other part, besides the stomach and intestine; for it is to be remarked, that constantly one organ is especially attacked, and exhibits disease violent in proportion as other organs are slightly affected. The mucous membrane lining the stomach is more or less reddened, particularly the portion within the right sac, the entire surface of which sometimes appears so. Besides which it is injected, and in some places ecchymosed. The red colour, proof incontestible of the existence of inflammation during life, appears under a great variety of shades: the deep brown tint shews gangrene, a change also indicated by the friability of the part and its speedy progress to putrefaction after death. Patches of redness are also visible in different places upon the membrane (the mucous follicles being larger than common); sometimes superficial ulcerations, petechiæ even, and *gangrenous* eschars, which may be nothing more than ecchymoses. Similar appearances are found in the small intestines, whose mucous membrane in many parts is reddened, injected, softened, and studded with assemblages of pointed eruptions: a grey, thick, glairy mucus and some petechial spots are also visible. In some cases, the matters contained in the small intestines are solid, and look as though they had been dried, though this is an appearance more common in the large guts, unless there happened to have existed diarrhœa before death: in the cæcum we almost always find this, and for some way also, though in a less marked degree, within the cells of the colon. More or less

inflammation is observable in the mucous membrane of the fauces; the sides of the tongue are covered with ulcerations resembling aphthæ; and the surface of the pharynx, which is more or less deeply reddened, sometimes presents a cribriform or worm-eaten appearance. Its follicles also often acquire such considerable development, that they might be mistaken for buds, with their orifices wide open. Some of these alterations are perceptible at times within the esophagus. When the disease has proved complicated, we also find after death alterations in those organs which have shewn a disposition to partake of it. The liver is often tumid, its veins are gorged with blood, and its substance is pale and without firmness: in some subjects ecchymoses and recent adhesions are apparent upon its exterior, evidently the consequences of inflammation. The lungs at one time are simply engorged; at another, within the anterior appendices and extremities of the lobes they exhibit the red induration; or they are hepatized in places, or inflamed around their periphery, and contain spumous blood. In certain subjects, the pleuræ are reddened and thickened and covered with layers of albumen, a part of which forms false membranes and points of adhesions to the walls of the thorax. Effusion is rare; notwithstanding, it has been observed by me in two instances, and in one of them so considerable was the quantity, that the case nowise differed from hydrothorax. According to M. Girard, whose observations we are now borrowing, the heart is the organ most and oftenest affected. The pericardium, commonly infiltrated in substance with yellow fluid, contains more or less serosity, sometimes bloody, and affords evident marks of acute inflammation. In many subjects the heart is twice its natural volume, its substance pale and discoloured, and, void of tenacity, rends with facility: its exterior, in a state of inflammation, exhibits black spots, the effects either of ecchymosis or gangrene (most probably of the former). Its cavities always contain black thick blood, semi-coagulated; and often yellow, consistent, fibrinous, albuminous concretions. These productions, large or small, exist sometimes, says M. Girard, in the right cavities, sometimes in the left, and sometimes in both right and left at once: they always occupy the auriculo-ventricular opening, and more or less completely fill it. Such appearances would have escaped observation both in men and animals, had not M. Girard pointed them out in horses in the gastro-enteritis, called the epidemic of 1825. Do they form during or after life? The former Director of the Alfort School entertained the first hypothesis, and thought that the concretions in question might prove the cause of death, by producing that suffocation which he had observed in horses who died suddenly, and in a manner asphyxiated. Supposing it were so, adds M. Girard, we should obtain an easy explanation to the obstruction of the lungs, the engorgement of the liver, the phlogosis of the air-tubes, and the presence of frothy mucus within them. According to the same authority, the internal surfaces of the cavities of the heart present vestiges of sur-acute inflammation; the redness is most remarkable in the tricuspid and mitral valves, and extends into the

arterial and venous trunks; though it is not equally perceptible in all the cavities of the heart, or within the venous and arterial trunks. * * * * In general, little alteration is visible in the brain; though in some subjects the exterior presents marks of inflammation. M. Girard once observed inflammation in the right lobe; and M. Rainaud speaks of the injection of the veins of the brain, of effusion into the lateral ventricles, of slight yellowish infiltration, and of concretions of the same hue in the choroid plexus. When the urinary apparatus participates in the inflammation, the kidneys are redder than ordinary, and their tissue is extremely lacerable; the bladder exhibiting red spots, and the urine being saffron or brick-dust coloured. In some instances the whole of the sub-cutaneous, cellular, and muscular tissue is infiltrated, and its areolæ are filled with yellowish fluid—an appearance most remarkable in the breast, scrotum, and sheath, when such parts have proved œdematous during life.

Such were the principal signs of disease observed in the horses who fell victims to the gastro-enteritis of 1825. The principal and most constant lesion, however—that which constituted the disease, and from which all the others were derived—was inflammation of the mucous membrane of the stomach and intestines.

The Diagnostic, from the number and confusion of the symptoms present, is often difficult as regards the organ essentially diseased, though there is no mistaking an acute attack of gastro-enteritis.

The Prognosis must depend upon the number and intensity of the sympathetic phlegmasiæ present, their extent and probable termination, as well as upon the gastro-enteric affection. In general, horses die from the fourth to the seventh day; the fifth day is commonly most critical; the ninth day that after which the patient is regarded as safe. The disease rages most in low wet situations, upon the borders of rivers, and in valleys. In cases of relapse, it is the fifteenth or twentieth day, or later, before convalescence commences; and sometimes so much debility is left, that the horse when down cannot rise without help. And as sequelæ, on some occasions we have swellings in different parts, or swelled legs, or lameness, first in one limb, afterwards in another. Time must cure all these anomalous affections: it is seldom we can do much for them by medicine.

Hygienal Treatment.—Under circumstances where there is reason to apprehend an attack of gastro-intestinal inflammation, we may hope to do much by way of prevention by attending to little affairs of management—change of diet—the substitution of good straw for hay—the withdrawal of corn altogether—sprinkling the provender with salt water—or, should the season and weather permit, turning the horses to grass; but not doing this, as too frequently is done, without some gradatory preparation, nor to suffer them to remain out in cold nights. To such as appear at all predisposed, it will be proper to give white water for drink, and, in lieu of their oats, a mixture of bran and barley-meal soaked in water slightly nitrated or acidulated,

and to administer occasional clysters of warm water, without keeping them from work, though that may be diminished. Good grooming is absolutely necessary; and care should be taken not to walk the horses into water on return from work. Should the animal be young and vigorous, a small blood-letting may prove advantageous, and especially in a case in which some other disease already exists.

Curative Treatment.—In determining the treatment of gastro-enteritis, either on the eve of its attack or when once it has commenced, regard must be paid to the nature of the causes that have produced it or may be continuing it, to the degree and extent of the inflammation constituting it, to the number and intensity of the diseases with which it is complicated. Among the therapeutic combatants for it, the most useful are blood-lettings, diluents, emollients, mucilaginous applications, with a proper regimen. The regimen must be severe, consisting of chilled water, very slightly nitrated, whitened with barley-water, and mixed with linseed mucilage, providing the patient likes it; and it may be sweetened with honey or treacle. This is all the aliment to be allowed, unless indeed the disease is but slight, in which case a little green-meat may be given, or chopped roots, such as turnips, carrots, or beet roots; but it is better to abstain even from them. We must never forget that the digestive organs are not in a condition to digest, however light the food. Should the animal refuse the drink offered him in his pail, drenches of linseed tea, a pint and a half each, may be given four or five times a-day. By way of stimulating the skin, the horse should be well wisped, or brushed, or curry-combed; and clothed warmly, particularly when he feels cold and shivers; and should the weather prove fine, he may be walked out a little. Should the urinary and faecal excretions appear pent up, the hand, oiled, is to be introduced, *per anum*, and the rectum emptied, and afterwards a clyster given, composed of gruel, or linseed-tea, or mallow-decoction.

In the country, where in regard to blood-letting we are not wont to be scrupulous or apprehensive, four or five pretty copious bleedings at the beginning of an attack may be found requisite. We have frequently pursued this practice, and by it have appeared to prevent many of those sympathetic phlegmasiæ which accompany and aggravate the gastro-enteritic affection, and to have subdued an acute inflammation, particularly when this has been associated with an attack of the pulmonary or cerebral apparatus. We drew from the two jugulars of one of our own horses, attacked in 1825, eighteen quarts of blood in twelve hours; in fact, we continued the bleeding until the fulness and hardness of the pulse gave way, without which we are persuaded we should have lost the horse. It is only, however, in cases manifesting decisive inflammation that such large and repeated blood-lettings can be permitted; and in such as these we are not to be deterred either by the first signs of prostration or the fear of adynamy: we are to use little hesitation under such circumstances, though much caution is to guide our practice in this respect when the inflammatory symptoms are but slight. The state of the

pulse, the condition of the patient, his age, strength, and form, and the degree and extent of the inflammation present, must regulate our proceedings.

Local Blood-letting.—As far as concerns the mucous membrane itself of the alimentary canal, it must be borne in mind that these general bleedings exert comparatively but little influence upon it: a large quantity of blood withdrawn from the jugular takes but little away from this membrane, and this large abstraction may occasion a debility which is not compensated for by the decrease of the gastro-enteritic inflammation. On this account, after a time, it becomes advisable to draw blood locally. As a substitute for leeches upon the epigastrium, which are applied with so much advantage in human medicine, we make punctures near together into both the subcutaneous thoracic veins, in a direction towards the diaphragm, and repeat these emissions at short intervals. Vapour baths directed upon the openings, or cupping glasses placed upon them, may be employed to obtain more blood. The second case we had was bled but twice, and both times from the thoracic vein; and venesection could not have been carried further without harm. These local emissions are especially useful to stay an incipient gastro-enteritis. The nearer the punctures are made to the epigastrium or umbilicus, the more efficacious. This is a blood-letting easy enough practised on the ox, on account of the large size of the subcutaneous *abdominal* vein; but in *monodactyles* this vein is less developed, on which account it is found more convenient or facile to open the *thoracic* vein at the place where it divides into two branches, from which spring the ramifications spread over the surface of the belly. It is always best, however, to open the abdominal vein, and, therefore, supposing on account of the fatness of the horse or other circumstances one cannot get blood enough from it, scarifications may be made, and upon them either cupping-glasses applied, or mustard poultices made with vinegar. This quickly produces a tumefaction, by scarifying which lightly, and subsequently fomenting it, the coagulation of the blood is prevented, and a sufficient emission obtained.

Medicine.—The mucilaginous drenches already prescribed will not be required providing the patient drinks the white water prepared for him; but then he must not be allowed to drink much at a time, and particularly when the abdominal heat is considerable. With this regimen we may with advantage give a mixture of liquorice root and mallows in some gummy solution. In the gastro-enteritis of 1825, benefit was found from the administration of drenches composed of linseed oil (olive or almond oil being too dear), honey or treacle and vinegar, in equal parts. To horses with constipated bowels, or who staled but little, we gave at first, in their drink every morning, two ounces of cream of tartar, and added for other cases nitre to the water: vapour baths and emollient fomentations prove also of great service. When horses are of great value and have much care bestowed upon them, we have suspended under their bellies, so as to be quite near without touching the skin, bags containing bran and linseed meal poultices, and renewed them every two

hours, keeping the animal the while well clothed. Unfortunately, this remedy, one of the best that we possess, is not practicable upon a large scale: in the case of our own two horses, we attributed success to this and to blood-letting. We have never found any thing necessary for the removal of constipation beyond emollient and oily clysters.

Complications.—Whatever may be the number and intensity of the sympathetic phlegmasiæ accompanying the gastro-enteritic inflammation, the basis of our curative treatment must be the same. We must do all we can to prevent these satellitic diseases; and if, in spite of us, some do manifest themselves, we must attack them in a manner and with means specifically appropriate to them.

Such is D'Arboval's exposition of gastro-enteritis, enriched with all his gleanings on the subject from the best French authorities; and such is an account of a disease which appears hardly yet to have found a place in British veterinary medicine. One case—one solitary case—is all that is to be found in *The Veterinariën** on the subject from our own countrymen. How is all this? Is it really so rare a disease? Or have we, when it has been present, called it—or rather miscalled it—by any other name? by fever, or influenza, or some other? From its mostly occurring in the epidemic form, it was natural enough for us to give the disorder the name of *influenza*; but, if this prove the cause of leading us to commit such gross misapprehensions, the sooner we get rid of—or, if that be impossible, the less we use—such an unmeaning, or all-meaning, appellation the better. I believe many of the cases presented to us about the spring and fall of the year will be found to possess the gastro-enteritic character; and this being once recognised, we shall find ourselves pursuing at least some rational course of treatment, and no longer, like grooms and farriers, blundering on, right or wrong, in wild empiricism. With these few comments on French pathology and English practice I shall leave the highly important subject before us to the future observation and consideration of my veterinary readers, not doubting that now that their attention is drawn to it they will in due time reap all the advantages to be derived from the cultivation of it.

* Sent to *The Veterinarian* for 1839, for the opinion of the Editor.

COLIC OR GRIPES.

THE nosology of farriers furnishes no appellations so vaguely comprehensive in their meaning, or so likely to mislead, as those of *colic*, *gripes*, *cramp*, *fret*, &c. By such persons they are used, synonymously, to denote an assemblage of symptoms which experience has taught us are produced by some painful disorder of the bowels, but of what nature or what part they leave us totally uninformed. We hear of *flatulent colic*, *stercoral colic*, *calculous colic*, *nervous or spasmodic colic*, *verminous colic*, *inflammatory colic*, and we are continually called to cases of "gripes," which turn out to be any thing save what we who restrict the meaning of the phrase can regard as such. In fact, while farriers' colic leaves us to guess whether the disorder consist in wind, in dung, in spasm, in calculi, in worms, or in inflammation, farriers' gripes merely signifies that the animal is labouring under some acute pains which are probably connected with bowel-disorder, though now and then the case turns out to be a pleurisy! In order to guard against all this looseness of expression and the danger it may create, the best way will be, probably, to pay no attention to the appellations *colic* and *gripes*, except so far as they are used to denote what, in truth, is the veritable *gripe*, or *grip*, or *grasp*, viz., SPASM of the bowels.

SPASM consists in a contraction of some portion or portions of the intestinal tube. The tube, by virtue of its muscular coat, possesses a power of contracting its canal, which contractile property it is that enables it to press the alimentary matters onward from the stomach, until they arrive at their ultimate destination—the *anus*. This muscular tunic, in common with other muscles, is liable to be affected with spasm or cramp; when which takes place the intestinal canal is locally contracted to that degree, that the aliment is arrested in its course, and the pain, while the cramp or gripe continues, becomes poignant in the extreme.

THE SYMPTOMS of colic are the same as, with two or three notable exceptions, denote painful bowel-affections in general. The attack is sudden. The horse appears to be all in a moment

seized with acute pain in his belly. He commences violently pawing and stamping, and striking his belly with his feet. After a few times bending his knees and crouching his body, and advancing his hind feet under him in attempts to lie down, he at last *drops* rather than lies down, issuing a sort of grunt from the fall, and immediately commences rolling upon his back, endeavouring every time he turns to balance himself in the supine position; though often he is unable to accomplish this until his legs in rolling happen to come against the side of the stall or box. When once he has got upon his back, he will, with his feet drawn downward upon his belly, and his head and neck, perhaps, curved to one side, remain quiet for a minute or two together, this posture appearing to afford him temporary relief. On other occasions, after several ineffectual endeavours to roll upon his back, he will suddenly rise again, and, having given himself a shake, as it were to get rid of the straws or dust about him, stand so quiet for a time that he appears by his rolling and struggling to have got rid of his pain. Soon again, however, he averts his head and regards his flank, with his ears down and an expression in his eye as much as to say, "There lies my pain, and now I feel it coming on again." Each successive fit or paroxysm turns out commonly to be longer and more violent than the one preceding. Early in the disorder, the remissions from pain, or intervals of ease, are evident enough; but as the case proceeds, the paroxysms growing longer, the remissions become shorter, and after a time altogether unobservable. The suffering the animal at this time endures, and the continual state of action and convulsion of body he is kept in, sets him heaving at the flanks, and causes him to break out into a profuse perspiration: drops of sweat stand upon his brows and eyelashes, and every hair in his coat becomes wet through. The next change, should his torture continue unmitigated, is one bordering on delirium: he grows heedless of all around him; his eyes turn wild and frantic; his violent precipitations render all approach to him perilous; cold sweats bedew his body; tremors succeed; he falls down, maddened and exhausted with pain, and in convulsions expires. The pulse at the onset of the disease, and during the remissions from pain, is but little altered; but while the paroxysm

endures it grows frequent, and becomes contracted to a thread, and, indeed, at times is so indistinct as hardly to be felt at all. Under the extremity of suffering, its quickness, and with that its strength and perceptibility, become augmented. The belly is tense, sometimes perceptibly swollen, and commonly very tender to pressure. The bowels are constipated, though oftentimes dung will be passed on the eve of the attack; and in the height of his pain the animal will void his urine.

DIAGNOSIS.—To this, as enabling us to distinguish colic from enteritis, great importance, by the generality of practitioners, has been attached, on the score of the remedies prescribed for spasm being, of all others, the most improper ones for inflammation. I was once of this way of thinking myself; but I find, as I grow in experience, that my practice is becoming of a kind suitable to both cases, and consequently that diagnosis with me is losing much of its interest. In the year 1824 I first made the experiment of combining my antispasmodic with a cathartic, and I became so satisfied at the result, that I have, from that time to the present, continued the practice, and, I may add, with the happiest effects. Still, it is highly proper that we should be made acquainted with the best diagnostics between colic and enteritis, and, according to my observation, they are as follow:—1st, colic is not ushered in by any antecedent indisposition, or any cold, or hot, or shivering fit; on the contrary, its attack is both sudden and violent: 2dly, when the disease has set in, the expressions of pain are stronger, and come on in fits and starts: 3dly, the purely spasmodic affection is marked by remissions—intervals of freedom from pain and quietude; and yet all the while may be observed that watchfulness about the patient, which clearly shews him to be in momentary expectation of another paroxysm: 4thly, the state of the pulse is characteristic; while the paroxysm is on, it is contracted to a thread, perhaps quite imperceptible, and yet not exceeding 50 in a minute. Professor Coleman was wont to attach much import to the circumstance of the horse rolling and reclining upon his back: for my own part, though I admit it to be in many cases a very prominent symptom, yet it is one I have seen present when no spasms have been detectable. I once treated a case the subject of

which lay on his back for upwards of a quarter of an hour at a time; and yet, when we came to open him—for he died—we found no spasms, but a tympanitic stomach, and an intense inflammation of the jejunum and ileum. Might not spasms, however, have existed during life?

Some affirm there is manifest heat of abdomen to be felt in enteritis, and lay great stress upon the observable difference there is in the manner of lying down: while the enteritic patient lies down quietly and with a degree of caution, the colicky horse drops down on a sudden, and flings himself about immediately afterwards in violent commotions.

THE CAUSE of colic, ordinarily, is a draught of cold water, especially while the horse's body is heated. Water from certain mineral springs has been—apparently from its impregnations—notorious for having this effect. Sudden chill of the skin is said to have produced gripes. A common dose of physic will now and then occasion it. I have witnessed the most violent spasms from both linseed and castor oils. Vetches and other green-meats will at times gripe; and so will new straw, and particularly wheaten; and likewise peas I am informed: in fact, any irritating or acidulous matters in the bowels may have this effect. Now and then, spasm is brought on by costiveness, and by stercoraceous and calculous concretions.

THE SEAT of spasm, in common, is the small intestines; in particular, the jejunum and ileum. I have seen the duodenum, however, contracted as well; in one case, a few inches from the stomach, its canal appeared to me perfectly impassable. I have also, in three or four instances, met with it in the large guts: in one, all three of them exhibited evident marks of spasm; the cæcum was exceedingly distorted by contraction, and, instead of being full of water, contained dung-balls; even the rectum had manifestly been spasmed. The intestinal tube is contracted to a third or fourth or more of its original volume, in spaces of two, three, and four inches, and, in some cases, even a foot or more in extent: on one occasion I met with contractions, one two feet, another a yard in length; the intermediate parts preserving their natural appearance. The parietes of the gut, in the contracted places, feel, from the

state they are in, thickened, when compared with other parts; added to which, they are in a remarkable degree whiter than the healthy portions. Sometimes it happens, in consequence of the confinement of alimentary or fluid matters between two of these contractions, that the intermediate portion of gut becomes distended to that degree, that congestion—even in progress to gangrene, as I have seen—ensues. In one case of death from unrelievable spasms—found afterwards to exist in the jejunum and ileum—I discovered the carotid arteries to be—spasmodically(?)—contracted to half their natural caliber, though nothing of the kind was perceptible in the aorta. During life, in order to obtain blood—not being able to procure sufficient from the jugulars—I was compelled to open the submaxillary arteries, and from these vessels even, owing to the contracted state of the carotids, the streams were nothing compared to what they ought to have been. In a case of extravasation of blood upon the cerebrum, I found the small intestines evincing in divers places contractions as great as if the horse had died of spasmodic colic; and yet he never had shewn a single symptom of gripes: a circumstance that might be referred, perhaps, to the purges he had taken. Another instance, however, of the same appearances happened to me in a horse I had been treating for a fistula of the worst description, who had not taken any medicine for some days before death. These observations would lead one to believe that contractions in the intestines may exist without necessarily causing the animal pain.

DURATION.—Unless some decided check—if not a satisfactory stop—be put to the progress of the disorder within the first half-a-dozen hours, we may begin to harbour apprehensions about our success. Ordinary cases are relieved by a single dose of medicine; many without any medicine at all. Cases that run on unrelieved to death, seldom exceed twenty-four hours in duration.

IN STONE-HORSES, particularly in such as have raced or been in training, or have been kept as covering stallions, an attack of colic or enteritic symptoms is on all occasions to be viewed as, possibly or probably, *connected with hernia*. The scrotum should be examined without delay, and all inquiries made relative to the existence of rupture. Should the symptoms continue unrelieved,

we must not rest satisfied with this even ; but proceed to an examination of the inguinal canals and abdominal rings, in order that we may be sure that no knuckle of intestine is incarcerated any where*. For the want of such thought and precaution several valuable horses' lives have been lost, some of whose cases stand recorded on paper, others only in the mortified remembrances of those to whom they have unfortunately happened.

RELAPSE.—There are horses who, from some peculiar susceptibility of the intestinal tube, are particularly obnoxious to this disorder. In such subjects a potation of cold water, in particular when the body is at all warm, is almost certain to induce spasm ; green-meat also, and physic, will most likely occasion it ; and, therefore, all these things should be avoided : for these repeated attacks become not only exceeding annoying, but, in the extreme, dangerous ; so much so, that one would feel inclined to counsel an individual possessing such a horse to take the first opportunity of disposing of him.

I attended the same horse for an attack of gripes in March 1826 ; another in April ; a third in June ; and a fourth in August, all of the same year : of which last, after having experienced relief for some hours, each time, at three separate intervals, he died ; as, indeed, I had predicted he would on the occasion of his surmounting, with much difficulty, the third attack. In addition to the ordinary contractions discovered in his small intestines, his stomach proved tympanitic.

THE TREATMENT of an ordinary case of colic is, in the estimation of almost every one who pretends to the possession of any horse-knowledge, an affair of that simplicity and obviousness that it is seldom deemed requisite to call in professional assistance. Every farrier and groom, horse-dealer and horse-keeper, fancies himself quite as competent to treat the case as the most skilful veterinarian ; and, in point of fact, providing the complaint be purely spasmodic, his remedy is likely to prove in the first instance quite as effectual as ours : it being notorious that almost all kinds of spirits and aromatics possess antispasmodic properties. The

* For the method of exploring the inguinal canal and abdominal rings, turn to the article "Inguinal Hernia."

groom, being well convinced of their efficacy from experience upon his own person, as naturally runs for gin and pepper, or peppermint water, for his horse when "griped," as he does for some agreeable spirituous compound for himself; or he probably possesses some nostrum, which he declares and believes to be superior to every other, and, as an incontrovertible proof of it, asserts, that it never fails to cure. And, given at the instant, perhaps, it very seldom does; for it imports less *what* we give than *when* the remedy is administered: that which is given at the outset appearing to have a decided advantage over any thing exhibited late in the attack.

BRACY CLARK prescribes for colic a tincture of pimento, with the following directions for its composition and use:—

"Infuse lbj of pimento in Oiss of water and the same quantity of spirit, for several days; strain the infusion, or let it stand until it be required for use. Give four ounces of it, mixed with common or peppermint water, immediately, and repeat the dose in half an hour, and every succeeding hour until the symptoms be relieved."

PROFESSOR COLEMAN's specific for colic used to be, oil of turpentine, given in doses of two ounces in a pint of tepid water, beer, or gruel, every one, two, or three hours, according to the demands of the case.

MY FATHER's favourite remedy was, one ounce of laudanum combined with two ounces of oil of turpentine and a pint of some bland tepid fluid.

OTHER PRACTITIONERS are very fond of the æthers. For my own part, I must say I think a combination of nitric æther and laudanum, in from one to two ounces each, in a pint of warm water, form a potent and effectual antispasmodic drench; at the same time I am quite ready to repeat what I said before, that it matters less *what* we give than *when* we give it. And, furthermore, I can affirm, I have in numerous instances seen all these various remedies succeed, and on some few occasions have been present when one and all of them have failed to afford relief. I consider that opium holds the first place among antispasmodics; and I put more trust in it when given in substance. I find very effectual an antispasmodic ball combining the three properties, narcotic,

stimulant, and terebinthinate, which I keep made up for the use of non-professionals: it is composed of one drachm of opium, of two drachms of Cayenne pepper or half an ounce of ginger, and of a sufficiency of Venice turpentine and meal to make a moderate sized ball.

MY PRACTICE—although I may give an antispasmodic drench or ball, alone, in the first instance—has now, from about the year 1824, been, in all cases of danger, to combine with the antispasmodic a full dose of purgative medicine; under the impression that, by so doing, I did not certainly detract from its power of relieving spasm; and yet—should the case hold out so long—that I had employed a powerful auxiliary, under whose operation all spasm and flatulent and fæcal obstruction must succumb. I, therefore, in a pressing case, give, without loss of time, the following drench:—

Decoction of aloes*	℥xij
Tincture of opium	℥ij
Spirits of nitric æther	℥ij
Water boiling	Oss. Mix.

Should the decoction of aloes—that admirable formula—not be at hand, we must content ourselves with a simple solution of aloes in hot water; bearing in mind that the dose is meant to be either ten drachms of Barbadoes aloes or twelve of Cape.

EXERCISE.—The common practice, supposing the attack to have just commenced, is to give an antispasmodic drink or ball, and immediately after to send the horse out to be exercised for twenty minutes or half an hour; the old rule in regard to pace being, that he may be trotted, but not so as to be made to perspire. I feel quite persuaded that exercise is often productive of a great deal of benefit; and therefore I am not so scrupulous about the pace and the sweating as some are: it increases the peristaltic

* Take of Barbadoes aloes, powdered,	℥ij
Carbonate of potash	℥j
Acacia, powdered	℥iss
Boiling water	Oj. Mix according to art.

Should the decoction be required to keep, two ounces of some spirit must be added.

motion, causes often the expulsion of air and dung, and as for the sweating, in my opinion it tends rather to relieve than to augment the spasm. For all this, I do not mean to say I would violently urge on a reluctant or unwilling patient with whip or spur: far from it, should he appear to be in such pain as to render him almost unable to move, I certainly would be the last to compel him.

BLOOD-LETTING.—Should a fair trial have been made of anti-spasmodic medicine and exercise, and all in vain, the next step to be taken is to let blood. And this having once been determined on, I would do it effectually, that is, I would draw blood until the horse was ready to sink from faintness, without any regard to the state of the pulse. The case growing desperate, our remedies must be potent and impressive. Such a large blood-letting is very often succeeded by a copious sweat; and so desirable an effect should be as much as possible encouraged, in the present instance, by warm clothing, &c. Should the case continue unrelieved, more venesections will be called for; but at what times and in what quantities the practitioner in attendance can alone determine.

CLYSTERS.—A clyster composed of two ounces of Cape aloes dissolved in six quarts of soap water or gruel, may be administered with a view of emptying the rectum; or one in which a pint of oil of turpentine is substituted for the aloes may be given with a view of relieving the spasm. But what, in a case of any danger, is better than either, is the clyster of tobacco-smoke; and the best apparatus for conducting this operation is Read's patent enema syringe, furnished with a metallic box for containing the tobacco, with a cribriform plate across the inside for transmitting the fumes*.

A WARM BATH would certainly prove a most desirable situation for our patient, could one be any how procured. In the absence of it, Mr. Wardle, in a moment of danger, plunged his patient into a dung-heap, the result of which was complete recovery after having been buried twenty minutes. A sackful of hay, dipped in water nearly boiling, and bound upon the belly, could it be managed, might likewise relieve him.

* This apparatus has been used with great success by Mr. Simonds, V.S., Twickenham, both in colic and enteritis.

COLD AFFUSION has achieved wonders in human medicine; but, though I have practised it, I cannot yet speak of it in veterinary. Buckets of the coldest water to be procured may be dashed upon the belly with considerable force even while the horse is standing, and with a great deal more facility and effect while lying.

FATAL CASES.—The following relation will shew that cases of *pure colic* will every now and then occur, baffling all ordinary treatment, and calling for measures of the most desperate kind we can employ.

In March last, a troop-horse, who from some idiosyncrasy had been the subject of two or three very violent attacks of colic, which induced me to say, that some day he would die of the disease, returned to the infirmary with—I forget whether it was—a third or fourth “fit of the gripes.” Knowing my subject, I at once proceeded to the most prompt and energetic treatment: but, this time, in spite of all that could be done, my patient, unfortunately, verified my prophecy. He was attacked at three o'clock, P.M. on Wednesday, and died at nine o'clock A.M. on Saturday.

Autopsy. All sorts of morbid appearances usual on such occasions had, in visions, run through my mind in the course of my attendance. I imagined there might be some volvulus, or knot, or intro-susception, or calculus; but then, no symptoms of mortification had come on, nor were there such decided signs of fever as we expect to find in inflammation. It had all along appeared a case of *pure colic*, accompanied with complete stoppage in the bowels: and such it proved. The opening of the abdomen exposed the bowels of their usual white glistening colour, and entirely free from inflammation. At least a dozen places in which the gut was contracted from four to six inches in extent, appeared in the length of the jejunum and ileum; and so close and firm were these contractions, that even now that vitality had left them, did some of them resist the insufflation of air through them: blowing through a pipe, as I did, with all my force. The stomach was very much distended with air: and how could it be otherwise, when not a particle of it could permeate the spasmed intestines? But the intestines themselves—the uncontracted portions of them—were, likewise, tympanitic. And as for all the medicine that had been given, none of it appeared to have reached beyond the extent of fourteen inches along the duodenum.

Here is a case for reflection—a case shewing that, dose the suffering animal with what we may, little benefit can be expected to result. I do not believe that all the medicine in Apothecaries' Hall would have caused relaxation of this horse's spasmed guts.

What then would?—I cannot say. I can only repeat, do not altogether rely upon internal antispasmodics; but, where they appear to fail, have recourse at once to such remedies as will be sure to make such an enervating impression upon the system as will tend to produce muscular relaxation. Bleed until the patient actually falls prostrate from loss of blood: and as soon as he has recovered the effects of that evacuation, exhibit tobacco-enema, potent enough and copious enough, to make him reel; and dash buckets of the coldest water that can be procured with as much force as can be used against his belly. These are the remedies, in my opinion, *most likely* to succeed in such case: if they do not, I cannot tell what will.

TYMPANY OF THE INTESTINES.

FLATULENT or wind colic—not so frequent in its occurrence as the spasmodic—has already in one of its forms—viz., that of *tympanitic stomach*—come under consideration; and, while treating of that, the present one has necessarily had notice taken of it, the two being essentially the same disease. The symptoms, also, they occasion, so much resemble those of colic or gripes, properly so called, that, were it not for the marked remissions attendant on the one, and the distention of belly which characterizes the other, we should find it impossible to diagnosticate between them. The patient's belly is visibly blown out—inflated all round the inferior and lateral parts like a drum; similar, in fact, to what we every now and then observe in inveterate crib-biters.

THE SEAT OF INFLATION is the large intestines—the cæcum and colon: were it the stomach alone, we should have none such outward visible signs of the distention. And the

CAUSE of it, is either indigestion or crib-biting. It may result—and I believe often does—from spasmodic colic; the spasmed condition of the intestines interfering with the process of digestion.

THE CONSEQUENCES of this inflated bowel may be such as to place the horse in the same perilous state as the hoven ox, an extreme case that will, perhaps, warrant the employment of the same remedy; though it must be borne in mind, that, as the two animals have differently constructed alimentary apparatus, an operation

which may prove quite harmless in one might be attended with great danger, or even loss of life, in the other. This, however, in the present instance, we are assured is not the case. Both in France and in our own country the belly has been trochared, not only without that danger which might have been anticipated, but with such results as would lead, in all hopeless cases at least, to a repetition of the operation*.

ENTERITIS.

THE intestines are composed of three layers of substance, called *coats*, any one of which may become the seat of inflammation, to the exclusion—although all three are intimately connected—of the other two; or, at least, so far to their exclusion, that the others appear to be but secondarily and comparatively mildly affected. Enteritis consists in an inflammation of the middle or muscular coat—that which forms the principal substance of the gut. We have evidence of this when we slit open an enteritic intestine: although the exterior looks as red as scarlet, the interior is found to be hardly flushed: even the aspect of the exterior is likewise illusive; for, if we now strip off the external or peritoneal coat, we shall discover that the redness is underneath, the raised membrane being in itself translucent, with a red bloodvessel to be seen only here and there, instead of such crowds of them as appear in the muscular tunic.

THE SYMPTOMS of enteritis are, very many of them, so far as regards the expression of suffering, the same as are present in spasmodic colic. Indeed, it frequently occurs that inflammation and spasms are combined: but whenever inflammation by itself is present, in some stages it seems hardly less painful than the paroxysms of spasmodic colic. Want of appetite, dulness, and feverishness, commonly usher in an attack of enteritis. Even should the disease, however, set in suddenly, it rarely manifests itself in the same subitaneous manner as colic. As soon as in-

* Vide "Tympany of the Stomach." The trochar used for the tympanitic gut should not be larger than that kept by surgeons, but at least three inches longer.

inflammation has taken hold, spasm probably seizes the bowel as well; and this must tend greatly to augment the pain. As in colic, therefore, the horse paws and stamps the ground; strikes his belly; makes feints to lie down; lies down; rolls, and, perhaps, upon his back; rises again; casts a dolorous look at his flank; pants, and blows, and sweats from pain. His belly is tense and painful to pressure, and towards the flanks drawn up; and nothing is voided save a few hard, angular, dark-coloured dung-balls, and they commonly at the commencement of the attack.

In enteritis there is not that interval of quietude or remission from suffering so remarkable in colic: and the pulse (instead of at one time being contracted to a thread, at another relaxed, and in number natural) is full and firm in its beat, and from first to last accelerated, even to a high degree, to double and in the latter stages even treble its natural number. The continuance of his torturing pains drives the animal to a state of extreme restlessness and distress: he is either pawing, or repeatedly lying down and rising again; or else he is walking round his box, breathing hard, sighing, and, perhaps, occasionally snorting. At length his respiration becomes hurried and oppressed; his nostrils widely dilated; his countenance painfully anxious and expressive of his sufferings; his body bathed in sweat, at one time hot, at another cold, and occasionally seized with tremor; and his tail erect and quivering.

The next stage borders on delirium. The eye acquires a wild, haggard, unnatural stare; the pupil dilates: his heedless and dreadful throes render approach to him quite perilous; in short, he has become an object not only of compassion but of apprehension, and seems fast hurrying to his end; when all at once, in the midst of agonising torments, he stands quiet, as though every pain had left him, and he were going to recover. His breathing becomes tranquillized; his pulse sunk beyond all perception; his body bedewed with a cold clammy sweat; he is in a tremor from head to foot, and about the legs and ears has even a death-like feel. The mouth, also, feels deadly chill; the lips drop pendulous; and the eye seems unconscious of objects. In fine, death, and not recovery, is at hand. Mortification has seized the inflamed bowel: pain can no longer be felt in that which but a few minutes ago was

the seat of exquisite suffering. Should the horse be down at this time, he may still muster strength enough to rise. Again, at the last, he becomes convulsed, and in a few more struggles, less violent than the former, he expires.

It does not invariably happen that a patient in whom the disease has terminated in mortification sinks immediately. I had, not long ago, a remarkable instance to the contrary. A horse of the Queen's Guard was seized with enteritis at half-past one o'clock in the morning. No medical aid was sought for him (and nothing, in fact, done for his relief) until half-past eight the same morning; at which time all convulsion from pain had subsided. Four quarts of blood were then abstracted; and afterwards I saw him, and ordered some opium in an aloetic drink to be given. At ten o'clock he walked, without apparent pain or difficulty, from the Horse Guards to the Regent's Park barracks—a distance of upwards of two miles. On his admission into a box, his body was found cold, his mouth cold, his extremities very cold; his pulse small and quick, and such as indicated to the feel "running down," or "sinking." He manifested no pain; but stood quite still, hanging his head, and looking hopelessly depressed and ghastly. He continued standing until four o'clock in the afternoon, every effort to warm his body having proved ineffectual. All at once his legs failed him, and he fell with his head twisted under his shoulder, and would, had not a man been in attendance, in that posture have died, strangled. He arose once more; but shortly afterwards sunk down a second time, and, after a struggle or two, expired. From three to four yards in extent of the ileum was found in a state of mortification.

THE SUREST DIAGNOSIS between colic and enteritis is to be found in the history of the case—in particular, in the *manner* of attack; in the intermissions; in the state of the pulse; in the progress of the case: all which will sufficiently appear from what has been already stated. At the same time, it must be borne in mind that colic, should it prove obstinate or protracted, is very likely to turn to enteritis; and that enteritis does not often run its course without occasional spasm.

THE CAUSES of enteritis are both numerous and various. We have seen that colic may give rise to it. Constipation may be viewed in the light both of cause and effect in its relation to it. Collected hardened *fæces* must naturally prove not only of themselves irritative, but obstructive and subversive of the functions of the bowels, and in either one or the other way may lay the

foundation for an attack of inflammation. Certain kinds of indigestible food, calculous bodies, irritating matters of any sort, in fact, within the bowels, may cause an inflammation of them. Obstruction of any of their passages—whether it be from the lodgement and immoveableness of the matters they contain, or from entanglement of the intestines, or intromission—must, in the end, occasion inflammation. Over-fatigue, and consequent excessive irritation in the bowels, will bring it on. Now and then, it will supervene upon a hard day's hunting; though this is a case in which the symptoms will be less violent, and yet often equally dangerous. Cold—from exposure, and skin wetted while hot, and so forth—is commonly entered high up in the list of the causes of enteritis, and, perhaps, with propriety; though, for my own part, I must confess I have not met with so many cases from this as from other causes.

HERNIA, as in the case of unrelieved colic, must here also—should the patient be a stone horse—become an especial object of inquiry*.

THE DURATION of enteritis, in all the intensity I have described it, cannot be but short. Destructibly violent and insufferably painful as the inflammation is, neither the part nor the constitution can withstand it for long: in from twelve to twenty-four hours, after it has once set in, a decisive change may be expected; too often that change is—and but too likely is it to be—death.

RELAPSE has often been observed after the primary attack has been subdued and the animal considered to be placed out of danger. I have seen the disease return a few hours after all had been put an end to by copious and timely blood-letting, &c.; and the second attack, in spite of all that could be done from the moment it set in, prove fatal. On this account I recommend a *second* blood-letting, in cases even where the first has proved successful, two, or three, or four hours after apparent recovery, should the pulse appear at all to warrant it.

* For the mode in which this inquiry is to be conducted, consult the account of Inguinal Hernia.

TERMINATIONS.—Enteritis may end in resolution, or rather in effusion. According to Hurtrel d'Arboval, it may terminate in hemorrhage. Its ordinary termination is in gangrene or mortification: indeed, this is the inevitable termination when it is the result of stricture, or entanglement, or mechanical obstruction, unrelieved, of any kind. The small intestines—in particular the jejunum and ileum—are the common seat of the inflammation, when it has arisen without mechanical obstruction, or has followed spasm. The affected parts exhibit various patchy shades of redness, from the pink or scarlet to the purple and even black hue; the last indicating that the part has become mortified, as, indeed, its softness and rottenness of texture satisfactorily demonstrate. This portion of the gut commonly contains air, and now and then exhibits, when cut into, masses of dark-coloured congealed blood. At the same time, it is common to see effusion of water into the abdominal cavity.

MORTIFICATION MAY ENSUE IN EIGHT OR TEN HOURS.—The case related at page 247 warrants this conclusion. The horse was attacked at half-past one o'clock in the morning; at half-past eight o'clock all convulsion from pain had ceased—he had become quite tranquil. This rapid and destructive course of inflammation seated in the bowels must be borne in memory, as a fact forcibly impressive of the extreme importance of putting what we determine on doing for the animal's relief into *immediate* execution. This leads me to say,

THE TREATMENT of a case of inflammation of the bowels requires on the part of the practitioner no less activity than judgment: without the one, the other will, indeed, avail but little. The rapidity of the inflammation; its tendency to mortification; and the poignant pain and irritation, and consequent fever, the animal all the while is suffering, vehemently urge us to the adoption of measures, not only of ready application, but of speedy effect. The first and grand thing to be done, is to let blood from the jugular vein to the utmost extent the patient will bear: the blood-can should not be taken from the neck until evident prostration demands it. Should this come on prematurely—should the horse stagger and appear faint from loss of blood, although but a few

pints have flown, pin up the vein, and administer to him his drench and an injection; and then, should his strength seem revived, have recourse once more to the fleam; for blood he must lose, and in large quantities, upon that mainly depending his recovery.

✓ **MEDICINE.**—There used to be—I believe there still exists—some scruples about exhibiting aloes in enteritis; although on all sides it is admitted that it is a case that calls most loudly for a purgative; or, at least, for a complete evacuation of the bowels. For my own part, I no longer hesitate to prescribe a full dose of aloes in solution, in combination with opium, the narcotic being now admitted by the best veterinary practitioners to be the best remedial agent we possess both for colic and enteritis. I would therefore give, in a pressing case immediately, the following drink:—

Decoction of aloes	Oj
Opium	ʒj
Boiling Water	Oss.

Dissolve the opium in the boiling water, and add the decoction.

I will not pretend to theorise about the therapeutical consistence of these ingredients; all I can say about them is, I am satisfied concerning the result in a practical point of view: and, after all, it is only following up some such line of treatment as is pursued in human medicine. Is not calomel and opium the surgeon's sheet-anchor in enteritis? How the same prescription would answer in the horse I know not, never having tried it; perhaps, not so well, the surgeon's chief aim being salivation. Some veterinarians give croton oil or powder in lieu of aloes, preferring it on account of its superior cathartic power. I think myself, however, that this superiority is more than counterbalanced by the degree of uncertainty attached to the operation of croton, and the somewhat greater length of time it takes, in general, to produce effect than Barbadoes aloes.

There are sufficient objections, in my mind, to giving oil of such kinds as castor oil, or linseed, or sweet, or olive oil: the two first are not without danger in their operation; the last is not sufficiently drastic to remove any feculent obstructions that may chance to exist.

OTHER REMEDIES.—The next thing required to be done, is *raking*—removing, as far as the arm will reach, every portion of fæces from the rectum; and this should be immediately succeeded by the injection, with the patent syringe, of copious aloetic clysters*. Hot flannels wrung out from boiling water may be attempted to be applied to the belly; a sheep-skin but just flayed is a good application, providing it can be confined upon the surface: but, unfortunately, there is generally much difficulty in accomplishing these soothing remedies, and sometimes considerable danger to the persons engaged in their application. A mustard embrocation—made by pouring boiling vinegar slowly upon mustard, and stirring them together to a proper consistence—can at all times be rubbed on; and I am not certain that it is not in the end more serviceable than temporary heat. A terebinthinate tincture of cantharides—made by steeping an ounce of bruised flies in half-a-pint of spirits of turpentine, in a stopper bottle, and kept ready for use—may be employed instead of the mustard: it is calculated to relieve, not only as a blister, but as an instantaneous counter-irritant. Some dash boiling water upon the belly. The late Professor Peall used to recommend that the surface be cauterized with a broad flat firing-iron. Mr. Hales, of Oswestry, has a warming-pan full of hot coals passed over the belly. An hour after the first blood-letting, should no change or abatement take place, a second venesection to the same depressing extent as before, followed by the exhibition of another opiate drench, the aloes, after the first one, being omitted, will probably be called for; and a couple of hours after that, even a third repetition of the opium: all this, however, must so entirely depend upon circumstances, that no unalterable rules can possibly be laid down.

As for food, the horse will take none; and even were he so inclined, he should not be allowed any. He will, probably, drink; and he may, with advantage, be suffered to drink as much gruel or white water, or even plain water, providing it is chilled, as he pleases: fluids will assist in bringing on purgation. Let simple

* Vide the clyster ordered for colic. The first time, give the purging clyster; after effect, the soap and water without the aloes: in extremities, the tobacco-enema.

soap and water or gruel clysters be frequently repeated. Also, repeat the embrocation or blister to the belly, should it not be found taking effect in five or six hours.

VOLVULUS AND INTUS-SUSCEPTION.

LENGTHY and loose and convoluted as the intestinal tube is, it is no wonder that portions of it, on occasions, become twisted or entangled; on account whereof all passage through its canal is arrested. Some highly instructive cases of this description have appeared in *The Veterinarian*: indeed, enough of them have of late years come to our knowledge to convince us, that such mishaps are of less rare occurrence than some twenty years ago we seemed to have had any notion of. The case which, from its comparative frequency, has attracted the most notice, is that where a new-formed body growing from the mesentery—commonly a globular adipose tumour—has, by means of the long chordiform pedicle by which it is attached, wound itself around a portion of ileum, doubled so as to form a sort of knuckle, and in that manner strangled the intestine. An instance of this occurred in my regimental practice in 1827. In 1829, the particulars of a similar one were published in *The Veterinarian* by Mr. W. Goodwin, accompanied with an illustrative engraving, which represents more naturally the state of the parts than any thing of the kind I have met with.

My cousin, Mr. C. Percivall, has related, in *The Veterinarian* for 1830, a case, in which the ileum proved to be “twisted and strangulated close upon its termination in the cæcum*.”

THE SYMPTOMS this internal stricture and strangulation of intestine produces are, in general, violent to a degree, though the same in kind as result from colic, or, rather, enteritis. The poor sufferer paws, and lies down, and rolls, and looks at his flank, and pants, in horrible agony; his belly becomes tympanitic, tense, and

* While this is going through the press, a fatal case of “gripes” has occurred to me, in which a knuckle of the same portion of the ileum was found insinuated and strangulated within the peritoneal passage through which the duodenum crosses the spine.

enlarged; and his pulse is quick and small—70 or 80—but not thready; at least, I have not found it so. For the first three or four hours, all that we do appears of no avail. Afterwards a calm takes place, and we are apt to think our remedies have worked it: if, however, we again examine the pulse, we shall find our patient is evidently sinking; perhaps, at the time, all over in a tremor and cold sweat; and that this deceitful calm is nothing but the too certain precursor of mortification. The animal commonly dies in convulsions.

DURATION.—Two of the cases mentioned survived twenty hours; the other sank in six after the attack.

RUPTURE OF THE INTESTINE has followed its entanglement. A curious and interesting case of this description* happened in the practice of Mr. Pritchard, Wolverhampton.

A cart-horse continued experiencing fits of gripes every three or four days, which were sometimes relieved by medicine, at others worked their own relief, from March to November. The attacks then became more alarming; the animal lost flesh, and was no longer capable of work. In December, he died. On opening the body, a strange "scene of entangled intestines" presented. Many of the convolutions of the small intestines were "entangled by three distinct cords, consisting of torn portions of omentum, which membrane was very much thickened." Though "so much fettered," no strangulation appeared. A strong, dense, firm ligature, of a dark colour, enfolded the base of the cæcum, which was formed by the mesocolon. "Between this ligature and the *caput coli*, to the left side, was a rupture, two inches in diameter;" through which quantities of liquid feculent matter had escaped.

INTUS OR INTRO-SUSCEPTION means the slipping of one portion of intestine into another—commonly into the one behind it. In the human subject, especially in children, this appears to be an accident by no means uncommon, and one that happens and rights itself again without any knowledge on the part of the person in whom it occurs. I would not take upon myself to say that such vagaries were not played among the bowels of horses; though it seems unlikely that they often are, from the circumstance of our meeting so rarely with any thing of the kind in our post-mortem inspections. Mr. Cartwright attended a colt, five weeks old, for quick respiration and pulse, and dropsical swelling of one arm, of

* Detailed in *The Veterinarian*, vol. iii, p. 95.

which he appeared to die. On opening the abdomen, however, he was surprised to find extensive intus-susception of the ileum. The small intestines are oftenest intro-suscepted: the French veterinarians have recorded some cases. But Mr. Hales, of Oswestry, met with an instance of the whole of the cæcum being inverted and received within the colon, the former being in a state of inflammation bordering on mortification. This horse suffered violent paroxysms of colic for four days. We have little else to lead us to a suspicion of these and such-like internal accidents during life, but the extraordinary violence of the symptoms, and the total inefficacy of all the means we employ.

PATHOLOGY.—I have long imagined—and I find I am far from being singular in entertaining such a notion—that sometimes it happens that cases such as I have been describing are the result of common colic; that, in the commotion excited among the intestines, some of them get twisted, entangled, or intro-suscepted, or worm themselves into situations from which they cannot withdraw themselves again. Still, however, many cases occur in which, from the change of structure apparent, as well as the adhesions present, it is evident that the contrary is the correct pathology; and that the mishap, whatever it may be, has existed for some considerable time past.

THE MORBID EFFECTS consequent upon these internal strictures are, inflammation in its various forms and stages, from the pink hue of the peritoneum, and of such intestines as are remote from the place of stricture, to the black and gangrenous condition of the parts immediately implicated. The intestines not only exhibit these various shades of redness; they are often found to be actually of different colours, some being red, some green, some black, while others remain unchanged—white*. Those guts that are anterior to the stricture are commonly distended with air: the rest are flaccid. The coats of such of them as are involved in the stricture are often enormously thickened from interstitial effusion. In Mr. Goodwin's case, the coats of the colon proved "almost three times their natural thickness;" also a great deal of blood—sometimes congealed, sometimes fluid—is occasionally found in their cavities.

* Care must be taken not to confound with these the changes of colour which ensue after death.

In the case related by Mr. C. Percivall, and in the one mentioned of intus-susception by Mr. Cartwright, the strangulated gut presented the appearance rather of a mass of extravasated blood than intestine. In addition to which, in Mr. P.'s case, there were from three to four gallons of fluid within the cavity of the belly.

DIAGNOSIS.—The only distinguishing symptoms I have been able to detect in such cases as volvulus or intus-susception, are—instead of the animal lying down and rising continually, and pawing and stamping, and evincing all that restlessness he does in colic and enteritis, he generally manifests the greatest propensity to lie down: lying down and remaining down, only trying from time to time various new postures for relief, such as lying now upon his side, then rolling upon his back, and afterwards by stretching out his fore legs, placing himself upon his belly, and from thence raising himself upon his hind quarters like a dog; groaning all the while, and casting many a dolorous look backward at his belly. He will seldom rise of his own accord; but you may rouse him up: no sooner, however, is he up, than he begins turning himself round, with his nose poking down, looking about for a fresh place to lie down upon. The pulse is not quick, but soft; and nowise thready or contracted.

TREATMENT.—In the beginning, these cases either really are, or are regarded as, colic; and as such are treated. After the elapse of some hours, finding our patient not amending at all, and the symptoms manifesting extraordinary urgency, we for the first time, probably, entertain suspicions that entanglement, or intus-susception, or internal stricture, or obstruction of some kind or other, must exist; but of what nature, or whereabouts, we are, and are likely to remain, in complete ignorance. In this state of darkness what is to be done? Some farrier of olden days answers—thrust an eel down the patient's throat, in order that it may crawl through the interrupted passages, and thus right them! Human physicians of former ages recommended that mercury should be poured down the throat, with the intention that, through its weight, it might penetrate from the stomach to the anus, and in that manner permeate the passages: and did the intestinal tube pursue a straight line through a man's body, the project would be feasible enough. As matters stand, I know really of nothing that can be

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done by way of remedy, unless we adopt the forlorn expedient of Fromage de Feugré, of making an opening into the flank sufficiently large to admit the hand, and, with it introduced, endeavour to rectify whatever may be found amiss. I doubt whether a horse would survive such an operation. Even supposing there was a chance of his survival, however, such cases as these are ever enveloped in so much mystery and doubt, that I do not think the operator with his groping hand at all likely to discover the true nature, even should he feel out the seat, of the mischief.

CALCULOUS AND STERCORACEOUS CONCRETIONS.

CALCULI or stones are said to be found in the stomach as well as in the intestines: but until I meet with some well-authenticated instance of this I must be excused from taking farther notice of it. Within the intestines they are oftentimes discovered at the slaughter-houses, and by the knackers are brought to us for sale; in which way we may soon make a collection, though, probably, without being able to glean the history of hardly any one of them. Commonly, they are found in the large guts; sometimes, in the small: their ordinary place of lodgement appears to be the colon. Mr. Karkeek reports a case in *The Veterinarian* for 1836, whose history he obtained from a farrier, in which the stone was lodged in the point of the cæcum. Mr. Goodwin mentions an instance of the small intestines being obstructed by calculus.

NUMBER, MAGNITUDE, AND WEIGHT.—There may exist but one stone; there may be several: or, like pebbles, calculi may and do occasionally collect together in very considerable numbers. I should think I have seen as many as a hundred taken from the same horse. Their magnitude will bear much relation to their number. I had one that measured eight inches in diameter when sawn asunder; and it weighed forty ounces. Opposed to this, I have possessed numbers not weighing as many grains each.

IN FORM AND COLOUR calculi also vary a great deal. Every stone possesses a *nucleus* of some kind, or central part, upon which the calculous matter collects, and this ordinarily regulates the form it is to take. Any hard body the horse happens to swallow may become this nucleus: pebbles, portions of grind-stone, grit of any

sort, &c. I had a stone in which a horse-nail formed the nucleus, as its external shape, indeed, would have led any one to imagine. Sometimes, however, the shape of the calculus will be determined by the place in which it happens to be lodged: many found in the colon are lobulated, like collected dung-balls, from having taken the form of the cells of the gut. Their colour depends, for the most part, upon their composition. The hard stones are generally white, or white streaked with red. The softer ones are dung-coloured, or of a dirty black hue.

THERE ARE THREE KINDS of intestinal concretions. One is hard and exclusively earthy in its composition, bearing much resemblance externally to our common pebble; though when fractured it is found to be made up of thin fragile strata, arranged after the manner of the several concentric lamellæ of an onion. The earthy matter has been found by Fourcroy and Vauquelin to be an ammoniacal magnesian phosphate. The second kind is soft, loose, friable, and without distinguishable lamellæ in its structure: it appears to be a composition of earthy and mucous and stercoraceous matters mingled together. The third kind consists of dry hardened dung and masses of imperfectly changed hay and corn, and, perhaps, straw as well, agglutinated together by the mucus of the bowels. There is a fourth kind—a ball composed of hair; but I am not so sure about this being found in the horse: in cows, who lick themselves, the production is common enough.

WHY CALCULI SHOULD FORM in a horse's bowels has no right to surprise us, when we know that not only is much dust swallowed with his food, but that the voracious feeder is disposed, whenever he has the opportunity, to lick up and swallow a great deal of dirt. Horses picquetted while troops are encamped, will commonly first tear up and consume every blade of grass or weed within their reach, and afterwards eat the roots and the very earth in which they grow; a propensity not, perhaps, natural to them, but one engendered from being dissatisfied with their scanty rations, as well as from having nothing else to divert attention when their food is gone. Even in the stable, dusty hay is often given; and oats full of grit and fragments of stone. Millers' horses are said to be especially subject to these formations, from the circumstance

of their food consisting principally of bran and mill-dust. The mill-stones must necessarily impart more or less of their substance to whatever they grind into dust or meal, and this gritty or calculous matter it is which becomes afterwards the principal component of the concretion.

EFFECTS.—Numerous instances have occurred of nothing having been known or suspected of the existence of calculi, until they have been accidentally discovered after death. Indeed, from what knowledge we possess of them in living bodies, it would appear that they seldom trouble the animal, unless their volume prove such as to block up the passage; and then, the same as an internal stricture, they bring on inflammation of the bowel, mortification, and death. They may, however, without materially obstructing, much irritate the bowel, and in that manner occasion the horse frequent paroxysms of pain, giving rise to symptoms indistinguishable by us from ordinary gripes. The colon is the ordinary seat of obstruction. Mr. W. Goodwin, as I observed before, met with it in the small intestines.

TREATMENT.—Supposing, from the animal's habit of feeding, or from some calculous matter having been observed in his dung—circumstances both very doubtful in respect to their presence or coming to our knowledge—that we had some reason to suspect the existence of stone, I hardly know how it could be removed. A brisk purge might be tried; but if the stone happened to be large and heavy, this would not be likely to expel it. Strong acids would dissolve the stone out of the body; but, in the strength in which one would dare to give them inwardly, they would certainly lose much if not all of their power, by dilution and neutralization, before they arrived at the calculus.

HARDENED MASSES OF DUNG have been known to collect within the colon, and block up the passage through it as effectually as if there had existed a calculus; which, purges and clysters, and every medicinal means that could be devised, have failed to remove. Mr. King, of Stanmore, had a case of this kind. Nothing had passed through the horse for thirteen days; and he had reason to believe that such was the nature of the stoppage. The animal's fate was sealed. And Mr. K. determined, as a last expedient, to

make an opening through the flank. He did so; and, introducing his hand, found what he expected—hardened fæces; which he squeezed and broke in pieces. The operation was followed by abundant discharges of dung. But relief had arrived too late; the animal already had sunk to a state of depression past recovery.

INTESTINAL WORMS.

OUT of the many kinds of worms inhabiting various parts of the bodies of different animals, we in general reckon four—though some mention a fifth—as claiming for their abode the intestines of the horse. That one animal should be destined to spend its life within the body of another, and be so completely dependent for its existence upon the one affording it a nidus, that it can neither live out of its body nor survive its death, is one of those phenomena appearing to us like a freak of Nature, but proving on examination quite beyond our understanding. A fact even still more curious than this is, that the same variety of worm which inhabits the body of one species of animal will not live—at least, so we have a right to suppose from its never being found—within the body of an animal of another class: as with lice and fleas, so it seems to be with worms; each kind having not only its appropriate part of the body as its nidus, but likewise its particular animal to infest.

Origin.—Hurtrel d'Arboval has been at the pains to review some out of the divers hypotheses that have been framed in answer to the obscure questions—*how do worms get into the body?* or, *how are they bred there?* The ancients entertained notions that they were bred there through corruption and putrefaction of various matters: such changes as these, however, we now know within a living body can never happen. A more reasonable hypothesis is, that numberless forms of worms are diffused throughout nature which only await time and place to develop themselves: this is comparing the worm to the bot, and without the support of any evidence to shew that the former, like the latter, undergoes any transformation—that they ever exist in any other than the state of worm; or, indeed, have the power of existence at all out of the body. What also operates against this notion is, that worms have been seen in the sucking foal; nay, in the fœtus even. Linnæus imagined that both water and earth contained these forms. Some have conceived that animals might transfer worms from one to another through cohabitation.

Velisnieri says, animals are born with worms, and that all have them; but that the development of them requires a concurrence of favourable circumstances. The worms found in *foetuses* have been ascribed to hereditariness; in which case the parents must be shewn to have some of the same kind; and, after that, a way must be discovered for them to get from one to the other.

The opinion most in favour at the present day is that which ascribes to them spontaneous and unassisted generation; though it seems one hardly nearer proved than some of the others. There are, however, some ingenious arguments advanced in support of it—worms existing prior to birth; their incapability of living out of the body; their presence in different parts, even in parts the most profound and impenetrable; the animal's total unconsciousness of their presence; each animal having its particular sorts of worms; and the worms themselves differing in structure from any out of the body, and not being able to subsist on any thing but digested alimentary matters and secretions. Now, as hydatids exist which are incapable, for want of sexual organs, of propagation, is it an impossible thing for particles of matter to coalesce and form worms, and thus become animate like as the hydatid does? Is it not in some such manner as this that the chyle nourishes and regenerates living fibre? To these questions, and, indeed, the theory altogether, Hurtrel d'Arboval has made some plausible enough objections; but these I have not room for.

PRODUCTION.—Peculiar states of body—certain external circumstances either conduce to, or else are consequent on, the presence of worms. Poverty of body appears to be favourable to their production: the common notion is, that the worms themselves reduce the animal's condition; it is one however that will, I believe, be found but in comparatively few cases to be true. Long residence on pasture in marshy or other wet grounds has been observed to be followed by worms. Stagnant water and miasms of various kinds have also been thought to give rise to them. It is certain that young animals are much more frequent subjects of worms than either adults or such as are declining in years; and that the more weakly or unhealthy such animals appear, the more likely they are to be or become verminous. It is difficult to deduce any principles or even plausible theory out of these several commonly admitted facts. Hurtrel d'Arboval imagines that the development of worms is connected with an excited or irritated condition of the alimentary passages—a condition in which their mucous secretion is augmented; one, he says, remarkable enough,

that is consequent on those states of general debility so frequently accompanied by worms. He cannot pretend to say whether the redundancy of mucous secretion is the cause of their production, or whether it may not be owing to their presence and irritation; but he feels himself warranted in asserting that their presence is always announced by signs of "sur-excitation" of the mucous membrane itself.

PROPAGATION AND DEVELOPMENT.—Intestinal worms, we learn from Rosen, are all oviparous; but there are, fortunately, many obstacles in the way of all their eggs hatching; for if such did not exist, the animal would probably be eaten up by worms. A certain degree of heat and repose are absolutely necessary; and both these, in particular the last, they are not always in situations to receive; and besides, many of them are carried away with the excrement, and expelled; in addition to others, which from various causes—morbid secretions, gases, deleterious matters in the aliment, &c.—turn out rotten. Once hatched, the intestinal grows the same as other worms, deriving its aliment by suction from the animal liquids and solids, and such secretions as seem especially adapted for them. From the circumstance of their dying at the time the animal containing them dies, it would seem as if they did not and could not subsist upon the alimentary matters in the intestines. Instances have been known of their becoming numerous enough to cause the destruction of the animal they inhabited; but such cases are very rare. In the opinion of Hurtrel d'Arboval, in all animals they do more or less harm. Their end may be, expulsion from the body alive, or they may die, and then become voided, and still entire and perfect: though, should they remain in the bowels any length of time after death, they would become changed and decomposed, and voided as what is vulgarly called "corruption."

THE SYMPTOMS assigned to the presence of worms are so numerous that one would think there could be no difficulty in pronouncing upon them; and yet, after all, how stands the matter of fact? Why, that in no one, nor even in all of them, can we place implicit faith, save and except the actual expulsion of one or more of the worms themselves along with the fæces. Those enumerated by various writers are,—expressions, more or less violent, of colicky

pains, attended with unusual whisking about of the tail, tenesmus; and frequent discharge of mucus, or else of dung, enveloped in glairy mucous matter; an oscillatory motion of the tail, even when no colic is present; and, from the continual itching about the anus, a disposition to rub the root of the tail or the rump against any thing within reach; the appearance of exsiccated matter, in the form of a white or else a yellow powder, about the fundament; the horse licks the white-washed wall, and nibbles the manger, and even parts of his own body as well; he eats any earth or clay or chalk he can get at, and is said to be fond of salt in particular; he raises his upper lip and rubs it against the wall: his coat is dry and rough, and remains on in patches long after it ought to have been shed; his skin is bound; he is lean, and cannot be got to thrive: added to which, there is a feverishness about him; his pulse is small and accelerated; his mouth unusually dry and warm; and his appetite is fastidious, as well as morbid. After all this detail, however, as I said before, I should advise that practitioner who sets much value on his correctness of judgment, to give but a dubious opinion until such time as a worm, or some fragment or evidence of one, appears in the fæces.

KINDS.—Of the genus of worms called *ascaris* there are many species. Rudolphi reckons seventy-eight: of them, two inhabit the intestines of horses; viz. the *ascaris lumbricoides*, and the *ascaris vermicularis*. There has been also found, on rare occasions, the *strongylus*, and the *tænia*; and some* say, the *fasciola*.

THE ASCARIS LUMBRICOIDES, or *lumbricus teres*, is the long round worm we most frequently discover in the dung of horses living in stables. In form it much resembles the common earth-worm, being cylindrical, about as large round as a woman's little finger, and in length varying from three or four inches to a foot. Two years ago I had one brought me that measured thirteen inches in length and one inch around its middle: another, the same year, that measured ten inches in length. Gibson says he has seen them "about eighteen inches long," and "larger than a man's finger." The worm is largest around its middle part, from which it tapers

* Chabert and Girard both testify having seen fasciolæ in horses.

off regularly towards either extremity, where it becomes pointed. In general they are white; sometimes they have a red cast. It mostly happens that a single worm is passed, which would incline us to believe they were solitary within the bowels; however this may be, we know, occasionally, they have been found not only congregated, but in vast numbers: Chabert tells us he found fourteen pounds (French) of them within a horse's small intestines! Their usual place of residence is the small guts; though I have found them coiled up together into a sort of ball within the stomach—at the same time that bots were clinging to its vascular part: rarely are any discovered within the large intestines. Be where they may, they are enveloped in mucus: seeming as if they preferred those situations in which it was most abundant. Hurtrel d'Arboval has observed, that in the places where they are lodged in any numbers, the mucous membrane is wrinkled and reddened; sometimes even exulcerated, and covered with a sort of fungus: all which he adduces as evidence of what he endeavours to prove is of the nature of an accompanying gastro-enteritis.

THE ASCARIS VERMICULARIS—*ascarides*, as we commonly call them—is the small, needle-like, lively worm we occasionally find in vast numbers within the large intestines; and particularly within the blind pouch of the cæcum. It is commonly white—though, I believe, there is a black variety—and seldom exceeds half-an-inch in length; and is at one end obtuse; sharp-pointed at the other. It is an exceeding lively agile creature—in liquid of any kind coiling and frisking about after the manner of an eel. On occasions it is detected making its escape from the anus. It appears to be the most destructive species of worm the horse harbours. I have heard and read of several instances of its pernicious operations: two or three I have myself witnessed. One I will relate here:—

My father possessed a horse between four and five years that never looked well, although he did his work, and was a voracious feeder. In October 1829, being at the time conditioning for hunting, instead of gaining he gradually lost flesh, although in other respects he seemed healthy, and was sleek in his coat, and unaffected in spirits and pulse and breathing, and fed well. One thing was observed—that ever since he had taken to lose flesh *he had not lain down*. Added to which, latterly, his appetite failed; and he was seen

continually licking and nibbling the rack and manger, and likewise his legs, shoulders, and body: a propensity that had become so strong that nothing we could do could make him desist. Being now reduced to the lowest ebb of emaciation, he was destroyed. The villous lining of the colon, and cæcum and its appendix, exhibited a dark-red colour, indicative of approaching mortification. Its surface was covered pretty uniformly with clusters of ascarides. There was no ulceration or abrasion. The inflammation seemed to be the result of the constant irritation of the worms. I had a case, some short time ago, of the kind, in which the intestines were similarly affected. This intestinal disorder I take to be the cause of death.

THE *STRONGYLUS* is very apt to be mistaken for the *ascaris*: I begin to think I must have committed this mistake myself, or probably should have noticed it earlier. It is a slender worm, from two to four inches in length, consisting of two distinct portions:—a body, constituting not quite one-half of its entire length, rather smaller than a crow-quill; to which is appended a contracted thread-like part or tail, making up the remainder of its length. When first voided, the body appears black; the tail transparent: no sooner, however, are they taken out of the dung than they vomit up their black contents, which has the appearance of so much black ink; and then their bodies, like their tails, become pellucid. In those I examined, this ejection seemed to be their last act of life, for they never moved afterwards, but gradually shrunk and dried up to almost nothing. Numbers of them were voided by a young horse under the operation of physic, who had given us no reason to believe he harboured worms of any sort.

THE *TÆNIA*, or *tape worm*, used to be designated by the French surgeons, *ver solitaire*, from a notion they entertained that never more than one was found: of late, however, our neighbours appear to have had ample reason to change their opinions; since Chabert has reckoned 227 tape worms in a dog; 91 in a horse; 19 in an ox; and 12 in a sheep. The singularity of this worm, both in its appearance and structure, is too striking to be once seen without ever afterwards being immediately recognized. It is white, flat, and tape-like in its shape, and of extreme length, but divided at regular intervals by articulations—sorts of joints. It is said to have measured twenty feet and upwards in length. It inhabits the small intestines, occupying from its great length a very consi-

derable extent of their canal. The head, which is tuberculous and placed at the slenderest end of the body, is said to be always directed towards—now and then actually within—the stomach. Tape worms are frequently found in, or vomited up by, dogs: but in horses their presence is extremely rare: only one instance is recorded in the Sick Journals of the Royal Horse Infirmary. I never met with the worm in my own practice.

REMEDIES FOR WORMS are numerous enough and various enough. We shall find a difficulty in choosing; and a still greater difficulty in selecting one of any real service. In England we have for a long while been in the habit of pursuing the plan of treatment laid down by Gibson—indeed, many still continue the practice—of giving what are called *mercurial purges*; i. e. of exhibiting one or two drachms of calomel one morning, and the next administering a common purging ball, with a view of bringing away in its operation the worms which the mercury is supposed either to have destroyed or else detached from their holding places: or, the calomel and the aloes may be mixed together in the same ball, in the proportion of one drachm to six or seven of purging mass. Gibson recommends “a *course* of these mercurial purges;” and directs us to follow them up with the administration twice or thrice a week of a drink composed of rue and chamomile and horehound, &c.

ANTIMONY.—The same author informs us that “most of the preparations of antimony are efficacious for destroying worms.” And this is a hint upon which we of more modern times have also acted. Many practitioners—myself for one—often prescribe tartar emetic with the intention of destroying worms. I will not aver that it has such an effect; but will honestly confess I, for my own part, have used the remedy rather from repute than any conviction of its efficacy. I have commonly given drachm doses of it for several days together, and then administered a full dose of physic.

FRENCH REMEDIES.—Chabert, who has experimented by plunging worms of various kinds taken out of the body alive into different medicaments, has come to the conclusion that nothing destroys them so speedily and effectually as the animal oil of Dippel, which he calls *empyreumatic oil*; next to this, he ranks *winter*

savoury, an infusion of which he used by way of a vehicle for the oil. He exhibited this combination of his two most powerful vermifuges to animals who manifested signs of worms: it did not in all bring away worms; but he concluded, nevertheless, that it had destroyed worms, from the circumstance of the animals from that period recovering their health and *embonpoint*. The dose of the oil is from half an ounce to one or two ounces, according to the age and strength of the patient: and this is given every day on an empty stomach.

A NEW VIEW OF THE TREATMENT.—Hurtrel d'Arboval, with some reason, remarks, that those who have written treatises on, and presented us with remedies for, worms, have—Chabert among the rest—neglected to notice *the condition of the passages* co-existent with the worms, and on which their presence, for aught they knew, might depend. To complete the pathology of the case, this undoubtedly ought to be taken into the account. For, should there be reasons for supposing that the worms by long and constant irritation had created much or extensive inflammation of the mucous membrane of the intestines, it would certainly become a question, whether we should be warranted in giving anthelmintics at all; or, at all events, such of them as were of a nature in the least stimulant or irritative. Aloes, in an especial degree, and also calomel and antimony, and even castor oil, would become, in this point of view, inadmissible. What, then, is to be done? D'Arboval sagaciously recommends that we should look to the apparent origin or cause of the worms, and see if we cannot, by adopting another mode of living, feeding, &c., enable Nature herself to get rid of her enemies; and, at the same time, by an appropriate diet, soothing drinks, gruel, linseed tea, &c., followed up by bitter tonic drinks, rid the intestinal membrane of its inflammatory irritation, and afterwards restore its healthy condition. Which done, we may, if necessary, have recourse to our anthelmintics. These “ideas,” which D'Arboval modestly submits to our consideration, *sous la forme dubitative*, are well worthy of our attention. Hitherto, as we all indeed know, little enough has been effected by medicine in this department: these new views may possibly lead to the accomplishment of something more satisfactory.

DIARRHŒA.

DIARRHŒA AND DYSENTERY are the technical and special appellations for what we commonly call *looseness, purging, scouring, &c.*, meaning thereby a frequent discharge of liquid excrement. The former, the mild kind of disorder, may exist either as an

IDIOPATHIC OR A SYMPTOMATIC AFFECTION: i. e., the purging may be either a spontaneous effort of the intestines themselves to throw out something proving obnoxious to them, or it may be the effect of hurried action of the canal, or of a degree of relaxation in its tone; or else the diarrhœa may be dependent upon a morbid condition of the intestinal canal, or of some organ immediately connected with it.

ANY KIND OF FOOD OR WATER OR MEDICINAL SUBSTANCE, that proves offensive or irritative to the mucous lining of the intestines, is likely to be productive of purgation; which, in the first instance, is nothing more than an effort of Nature to get rid of the offender. Green food of all sorts, as well from the water it has in its composition as from its acidulous properties, has this tendency; the horse is said to be "soiled" by it, and in consequence—according to the groom's notion—to be cleansed of all that is impure and humoury in his blood: an old fashioned doctrine, in which there is a great deal of practical truth, though it is somewhat homely expressed. This "green doctor," however, may be pursued to an injurious extent. Cold, wet, rank pastures are, by long continuance in them, exceeding apt to generate diarrhœa; and this of such a nature as is very likely in the end to run into the worst form of this disease, or what is called *dysentery*. Even simple water, given at an improper time and in an improper quantity, will be productive of purgation, and that may run into a diarrhœa. Every traveller knows, that if his horse gets a pailful of water before he starts on his journey, or while on the road, it will most likely throw the animal into a profuse sweat, and set him violently purging. Independently of which, there are waters possessing peculiar properties or impregnations which take a *medicinal* effect on the bowels. As for medicinal substances, there are many that

will excite purgation, on the principle of causing irritation; but few that have the effect in the specific manner that those we denominate *purges* have; of which our most potent and efficacious is aloes.

There was a time when the veterinarian was indebted to the groom and the horse-dealer for most of his cases of diarrhœa—when from one to two ounces of aloes, and calomel besides, were given indiscriminately to young horses on their arrival out of the country. Such practices, however, are in a great measure discontinued; and, for humanity's sake, it is a fortunate thing they are, as the super-purgation was occasionally attended with such intense inflammation of the intestinal membrane, that the death of the animal became an inevitable consequence.. Even blue vitriol, which we regard as a tonic, will very often, in large continued doses, give rise to purgation. Indeed, this is by no means an uncommon effect of any medicinal, when once it is carried to a poisonous or an injurious length. The horse is seized with griping pains; gurglings are heard in his inside; and he continues to express painful uneasiness, until on a sudden a copious emission of liquid dung and flatulence burst from him, when he becomes as suddenly relieved, and remains so for a short interval; and then his gurglings and pains become renewed, and end, the same as before, in alvine and flatulent discharge, and a return again of ease. The early discharges consist almost entirely of liquid dung: those that succeed are much intermingled with mucous and gelatinous secretions from the lining membrane of the bowels. The emissions also vary in colour; and in some cases, though not commonly, have an offensive fœtor.

INCREASED PERISTALTIC ACTION will, by hurrying the alimentary matters through the intestinal canal while yet in a state of fluidity, likewise induce purgation; and especially, as I noticed before, in a body in which these matters have already been reduced to copious liquidity by a large ingurgitation of water. And this is an effect more easily producible on a certain kind or make of horse—one that we vulgarly call *washy*—than on one of a different conformation. These *washy*—*watery*!—horses are, in general, found to be loosely made, slack in their loins, hollow-

backed, high-hipped, and pot-bellied; and very commonly are of a light chestnut or bright bay colour, with white legs. There seems to be a want of brace or tenacity of fibre in such horses, in their inward as well as in their outward parts; which, added to a peculiar nervousness and irritability they in general evince, will serve in a great measure to account for their liability to diarrhœa—at least, from the causes just mentioned.

A CONGESTED OR AN INFLAMMATORY STATE OF MUCOUS MEMBRANE may exist in company with, or in consequence of, some of the causes already particularized; or it may arise independently of them. Irritations of all kinds will naturally tend to the production of inflammation in it; or the same may be caused by wet or cold applied to the skin, by suppressed perspiration, metastasis, &c. In fact, whatever tends to throw the current of blood upon the bowels, and thereby to augment their serous or watery secretions, may be considered as a cause of *serous diarrhœa*.

Inflammation, however, may rapidly seize the membrane, and mount to that degree, that its serous secretion, instead of being augmented, may be diminished or even altogether arrested; and there be effused in its stead flakes or strings of coagulable lymph, which, along with the mucus issuing from the follicles of the membrane, clings to and envelopes the dung-balls; and, in consequence, they come away in those glairy gelatinous coatings farriers and grooms so familiarly recognise under the appellation of *molten grease*. Over-working, or “over-marking,” as it is called, is a common cause of this inflammatory condition of membrane, one that often creates a great deal of constitutional irritation, so much on some occasions as to end in death; though a frequent and natural issue of it is diarrhœa; and this appears to be the most favourable turn the disorder can take. It not unfrequently happens that the mucous follicles participate in the inflammation—though they may only be excited to increased secretion—in which case ulceration of those parts is very likely to follow, and thus becomes laid the foundation for a painful and troublesome form of diarrhœa, or rather, I would say, for a *dysentery*. At other times the inflammation pursues a more directly destructive course, and speedily ends in mortification of the membrane and death of the patient.

DISORDERED STATES OF THE LIVER, MESENTERIC GLANDS, &c., may prove the origin of diarrhœa, either from the irritation created by unhealthy secretions, or from functional connexion, by sympathy. Green-meat, especially the spring productions of this kind, appear to have considerable effect in augmenting the secretion of bile, and thus to give rise to a sort of *bilious diarrhœa*: new hay likewise has this tendency. Of the pancreatic juice, and its uses, we know so little that we are without the power of pathologizing on this part of our subject. But in respect to the mesenteric glands, as we shall learn hereafter, diarrhœa is one of the symptoms by which we are led to suspect the presence of disease in those bodies.

EPIDEMIC BUT NOT CONTAGIOUS.—Many horses in the same stable, fed and worked and otherwise treated alike, may have diarrhœa at the same time, without there existing any reason to believe the disorder to be contagious: the cause or causes producing it in one being such as produce it in all of them; and the cure consisting in removing them from that situation, or changing their food or water, or whatever appears to have originated the disease among them. These remarks equally apply to dysentery.

THE TREATMENT OF DIARRHŒA must be framed and conducted in accordance with the causes to which it owes its origin, and perhaps continuance, and also with reference to the state of the intestinal membrane, together with the condition of its own secretions as well as of those which it receives from other parts. Many—I might say, most—of the cases of diarrhœa that come under the veterinarian's notice, require no *medical* treatment at all: the good the practitioner does in these cases is to stay the hand of ignorance and presumption from doing harm. It is incalculable what mischief has been done on such occasions by the early exhibition of chalk and opium and other astringents, which, by checking this sanative effort of Nature, has converted a simple flux into a violent enteritis, and in that manner destroyed the patient. Whenever we find the purging to be the effect of food disagreeing with the bowels, or of water possessing some obnoxious property, we are to view the flux as Nature's effort to get rid of the offending matters, and her own mode of working a

cure. And all that art can or ought to attempt to do, is to assist Nature in this her process of cure. Instead, therefore, of checking, our duty is to encourage the diarrhœa; to give the horse gruel and linseed tea, and other mucilaginous drinks, which, while they augment and dilute the discharges, serve, by their emollient qualities, to soothe the membrane, and defend it from the acrimony and irritation of the obnoxious matters. This constitutes the grand principle of treatment of diarrhœa of this class: at the same time, it is one that ought never, in fluxes of any description, to be disregarded; seeing that a great deal of harm is likely to be done by acting, without great caution and discrimination, in opposition to it. Remember, this soothing will avail nothing without, however, change of diet, should the food be in fault; or change of water, should that have done the mischief: and in making this change we should endeavour to substitute an astringent diet for the one of a laxative nature. Warm clothing and dry comfortable stabling are of great importance: not merely should we be desirous to divert the blood to the skin and extremities, but by warmth and dressing, likewise to restore to the skin its natural exudation, smoothness, and polish. In a case where these simple means proved insufficient, and there were evident signs of fever, I would not hesitate to draw blood to the amount of a gallon in a full subject—less, in a washy or weakly one; and this step I would follow up once or even twice afterwards, providing I found benefit from it. A stimulant over the surface of the belly ordinarily turns out an excellent sequença to the blood-letting. Our pharmacopœia does not furnish a medicine well calculated for recent and acute diarrhœa. Did we possess any medicament that could be trusted to act mildly and safely, as castor oil does on a man, or the same as magnesia and manna and rhubarb do, we would gladly in such a case as this have recourse to them. Aloes is much too coarse and drastic and griping a purge to introduce; and as for sweet or common olive oil—which I know some would give in pint doses and upwards—for my own part, I deem it of very little efficacy. Should the patient be annoyed by fits of colicky pains, there will be no objection to exhibiting small doses of laudanum—from half an ounce to an ounce—in a quart of warm

gruel or linseed tea, and to repeating them twice or thrice a-day. Starch clysters may also be occasionally administered, either with or without laudanum in them, to relieve any symptoms of tenesmus or irritation in the rectum or colon. Not until other means have failed, and we have dispersed the inflammatory characters of the case, should we venture on *astringents*. One of the best and safest is the compound chalk powder of the *London Pharmacopeia*: this aromatic, soothing, binding preparation, may be administered either in ball with syrup or mucilage, or in drink with gruel, or starch, or linseed infusion. In case it is required to increase the narcotic effect of the powder, either opium in substance, or laudanum, may be added to the ball or drench. Should the evacuations exhibit a bilious character, or there appear any reason for supposing the liver to be faulty in its duties, an excellent corrective will be found in the *hydrargyrus cum cretâ*: from half to an ounce of it mixed up with syrup into a ball may be given once or twice a-day for a week, or even a fortnight, if deemed requisite.

DYSENTERY.

By dysentery is implied the *flux*; or, as in another form it has been called, the *bloody flux*. As in diarrhoea, the evacuations are both liquid and frequent; but in dysentery they possess the additional characteristics of being totally altered from their natural appearance and odour, being disgustingly foetid, purulent, and bloody, and at times more like coffee-grounds in appearance than alvine matters.

THE ESPECIAL SEAT of dysentery is the *cæcum* and *colon*; and ITS NATURE—as far as my experience in so rare a disorder will permit me to speak—especially consists in abscess and ulceration of the mucous follicles of the membrane lining those intestines. The morbid appearances I have observed are—a jagged sort of exulceration of this membrane, covered with a brownish or dirty fetid purulent matter, and here and there small abscesses, which to me looked like so many distended follicles. In regard to the sound parts of the membrane, which itself is in a state of thicken-

ing, in one case I found them flushed from inflammation; in another, their surfaces exhibited a leaden hue, and were bloodless. I have, however, seen dysenteric intestines gangrenous—so rotten in texture that they would not bear removing without rupture; and in a state of distention from gas so disgustingly fetid, that it was next to impossible to hold one's head over the gut when it was opened.

THE SYMPTOMS characteristic of this state of bowel, are—frequent evacuations of an offensive nature and an unnatural colour, consisting of lumps or pieces of solid matter floating in a fluid, which I have on occasions compared to coffee-grounds, accompanied by purulent, at times even by bloody, discharges; tenesmus: the animal lies much, unless when he is annoyed with griping pains, though these seldom come on until late; he falls away from day to day, notwithstanding that his appetite, though perhaps impaired, is by no means so very much to be complained of; his thirst is constant and insatiable; a slow fever attends, the pulse being about 60; fits of cholic supervene, or, should they be already present, towards the latter stage they grow more painful, and in one of these fits the animal, harassed and exhausted by continual irritation and loss of aliment, expires.

THE CAUSE—the ordinary one—of dysentery, is long sojourn in low, wet, marshy pastures. I have already shewn that such situations cause worms to be bred or produced in the body; I have also remarked that lousiness is a frequent concomitant of poverty and hide-bound, states consequent on the emaciation occasioned by dysentery. I once received a horse from Plumstead Marshes to treat, who was dysenteric, verminous, hide-bound, and lousy, and withal in a state of debility. Other causes, however, may produce the disorder. A diarrhœa grown chronic and of long continuance may terminate in dysentery. Food of bad quality; water of a peculiar kind; exposure to sudden changes even, in horses of weak fibre and irritable bowels, may tend to its production. In situations where any of these causes are prevalent, diarrhœa or dysentery may arise and assume the appearance of infectious or contagious diseases; but—to repeat what I said before—they, neither of them, are in anywise communicable from

one horse to another, in the manner that dysentery is said to be from one man to another.

TREATMENT.—The rarity of these cases, together with the little notice they have received, as distinct from diarrhœa, will account for the little we are able to derive from experience in regard to their management. Were there any signs of inflammation in the bowels—any manifestations of pain or even of uneasiness in them—providing the condition and strength of the animal admitted of it, I would bleed; but not to a large amount—say three or four quarts. Cliché, a French veterinarian, recommends the application of cupping-glasses to the anus: the comparatively small quantity of blood known to be thus abstracted, together with the distance between the anus and colon, are circumstances which must render such practice, I should imagine, next to nugatory. The next thing to be done is to clear out the bowels, and the only medicine we have for this purpose is aloes, which—though on some accounts objectionable—appears to be demanded to accomplish so desirable an object in the treatment. Its operation may be encouraged by clysters. A stimulant to the surface of the belly will prove beneficial. The skin should be kept warmly clothed; the legs bandaged with flannel; and a dry and comfortable loose box be provided for the patient. His food—after the working off of the physic—may consist of the best hay and oats, with a proportion of old beans; the latter being a mild and nutritive astringent. His drink should be gruel; or else linseed or hay tea. Should the bleeding, and purging, and stimulating, fail to alter the nature of the discharges or at all check them, we may try the effect of mercurials, in alterative doses. I have given with great advantage from one to two drachms of *hydrargyrus cum cretâ* in combination with half the quantity of ipecacuanha or Dover's powder twice a-day, followed up by an occasional clear-out of the bowels. Should neither the antiphlogistic nor the alterative plan of treatment succeed, but the flux still continue, and so as to produce debility and all its bad consequences, we must have recourse to astringent medicines and opiates. The compound chalk powder, in the manner recommended for diarrhœa,

may be first tried, with, should it be required, an increased quantity of opium : in the event of this failing, I know not to what one can have recourse—save it is to catechu.

HERNIA.

BY a *hernia*, the popular appellation for which is a *rupture*, is understood, the protrusion of some viscera of the abdomen out of their proper cavity into some other, or else into some interval near the surface of the body.

THE PLACES where these protrusions commonly take place in quadrupeds, are, the groin, the navel, the sides of the belly, and the diaphragm. It is these differences in situation that constitute

THE DIFFERENT SPECIES OF HERNIA, which are four. That protruding at the groin is called *inguinal*—the same extending through the canal and descending into the scrotum, taking the name of *scrotal*; that at the navel, *umbilical*; that apparent upon any part of the surface of the belly (the navel excepted), *ventral*; the one passing through the diaphragm, *diaphragmatic*.

THE PARTS PROTRUDED in hernia are commonly either the intestines or the omentum, or both. Every abdominal viscus, however—nay, even the thoracic and cerebral too—must be regarded as liable to become hernial*.

ANOTHER DIVISION OF HERNIA is into *reducible*, *irreducible*, and *strangulated*. When the contents of the tumour admit of being returned into the abdomen, the hernia is said to be a “reducible” one; when, either in consequence of their bulkiness, or their adhesion to the sac containing them, or to each other, that is found impracticable, the hernia becomes an “irreducible” one; should there be constriction at the mouth or contracted part of the

* To a French veterinary surgeon, M. Sanitos, occurred the very singular case of *hernia of the bladder*. The horse had the usual symptoms of colic, and on examination was discovered, towards the inguinal ring on the right side, a tumour as large as a man's fist, separated, as it were, from the scrotum, and hanging considerably below it: so large did it become, that it required to be suspended by a bandage.

sac—which in inguinal hernia is at the internal abdominal ring—to that degree that the circulation is either impeded or altogether arrested, the hernia is said to be “strangulated.”

THE HERNIA THE MOST FREQUENT, as well as the most important, is inguinal: to which, on both these accounts, it will be necessary that we should give our fullest consideration. In doing this we shall find, as we proceed, that many of our observations become equally applicable to the other kinds of hernia, a circumstance that will tend still further to abridge our descriptions of these minor species.

INGUINAL HERNIA.

THE rarity of hernia in this country has afforded British veterinarians but scanty opportunities for observation compared to those enjoyed by our continental brethren, and this satisfactorily accounts for the absence of any work of our own containing the required information on the subject; a circumstance that might be on occasions much deplored, were we not in possession of one in another language, which supplies all we can possibly want or wish for; from whose valuable pages I shall take the liberty to transcribe so much as will prove really practical and useful to us. I need hardly add, I allude to the magnificent work of the distinguished French professor, Girard*.

The custom in France, Germany, India, Arabia, and some other countries, of preserving horses entire, is the reason to be assigned for the prevalence of hernia in them; on the other hand, the little we are troubled with the disease in our own land is a proof that the practice of castration operates as a pretty certain prophylactic against its occurrence. And when we meet with the disease, it is not often in geldings but in stone-horses, and particularly in such as have raced or been in training. This accounts for army practice

* A Treatise on Inguinal Hernia in the Horse, and other Monodactyles. By Girard, Director of the Royal Veterinary School at Alfort. Paris, 1827. This work was, in extracts, translated and commented on by me in *The Veterinarian* for 1829.

seldom producing such cases; at the same time that it affords a strong reason for a thorough acquaintance with the subject on the part of the veterinarian whose sphere of practice is likely to embrace any racing or training establishments.

WHY MANY MORE MEN THAN HORSES BECOME RUPTURED
Girard thus learnedly and satisfactorily explains:—

Animals are much seldomer the subjects of hernia than men, not less on account of the horizontal position of their bodies than from the disposition of the muscles and fibrous envelopes forming the inferior parietes of the abdomen. In man, the intestinal mass is bearing downwards, and particularly upon the inguinal regions, where the openings—the abdominal ring and crural arch—are situated. In quadrupeds, on the contrary, in consequence of the oblique inclination, forwards and downwards, of the floor of the belly, from the flank to the brisket, the intestinal mass gravitates against the diaphragm, pushing it forward and occasionally rupturing it. The resistance afforded by the parietes of the belly is likewise greater, owing to the increased density and peculiar disposition of the coverings of the abdomen, the *fascia superficialis* being thicker, more elastic, and more developed than in man, and particularly towards the pubes, and being supported by the *panniculus carnosus*, an envelope that does not exist in man: added to which—not to mention the advantages arising from the oblique and straight muscles, which latter are much broader than in man—the *fascia transversalis* is considerably stronger and more expanded. Connect with these facts the practice of castration at an early age, one consequence of which is the contraction of the inguinal canal, and there will appear sufficient to account for the comparative exemption of the horse from inguinal rupture; and, at the same time, for the unheard-of occurrence of the species denominated *femoral**.

* Since this was written, such an “unheard-of” case has happened to M. Seon, V.S. to the *Garde Royale*. He was called, while on the march, to a mare with a swelling as large as his fist in the upper and fore part of the inside of the thigh. The existence of hernia was evident beyond dispute. By compressing and pushing its contents backward and upward, he caused the whole of them to re-enter the canal, but they speedily re-appeared. Bandages and compresses of tow kept the hernia reduced, but their tightness caused alarming tumefactions which required their removal; and the consequence was, on the sixth day the hernia returned. The mare was now cast, the hernia reduced, and pledgets of tow, dipped in melted pitch, plastered upon the situation of the tumour, and over them, one, twelve inches in diameter, of pitched strong canvass. As soon as the pitch had set, the mare was let up. In ten days afterwards the plasters had fallen off, leaving some ulcerations, which readily healed. The place opposite the termination of the femoral canal subsequently exhibited a species of callus.

The Contents of Inguinal Hernia consist, almost in all cases, of the small intestines. From their looseness of attachment, their volume, their general inanity, and their energetic contractility, they the most readily enter the inguinal canal. The duplicatures and flexures of the colon are the parts next most liable to protrusion. In respect to the omentum—which is so short that one would conceive it impossible it could ever reach the canal, without laceration at least—its protrusion is uniformly the effect of some violent intestinal commotion, and is never the occasion of much mischief. When the contents are intestines solely, the hernia is denominated an *enterocele*; when nothing but omentum, *epiplocele*; when both combined, *entero-epiplocele*.

The ordinary Causes of inguinal hernia are, the peristaltic commotions, excited by colic. The rupture, however, may happen under the efforts occasioned by a heavy burthen, or in the acts of rearing, kicking, leaping, &c. To these causes—as practitioners in England—we may add those violent exertions the animal is forced to make in racing and hunting. The force with which the diaphragm recedes in the efforts made by the running animal to expand his chest—dilatation of the cavity laterally being much opposed by the confinement of the ribs by the girths—impels the viscera backwards against the abdominal rings, through which one or other of the small intestines—they being the loosest, smallest, and most glib parts—is very likely to be protruded. This accounts for our viewing horses that have been in severe training with great suspicion when they are brought to us for castration. In India, where hernia is very frequent, Mr. Molyneux—a gentleman who has written a very good paper on the subject in *The Veterinarian*—informs us that “exertion is the chief,” and, he believes, “almost only cause;” though on one occasion he knew it “to be produced by constipation”—by “the exertion used in expelling the fæces.”

Hernia may arise from mechanical injury; of this the following affords a good illustration:—In 1820, Mr. C. Percivall went to see a black cart colt that had received a kick, five days before, from another at straw-yard. He found a large swelling along the posterior and inferior part of the belly, which was soft and yielding, as if it had been a bladder distended with air. He easily reduced it, and applied a compress and roller, bled and gave some aloes. In three weeks, though considerably diminished in volume, the intestine was still very perceptible. “After this,” adds Mr. P. “I blistered the part, and certainly with good effect; though the scrotum ever afterwards remained hernial.”

Stallions are the ordinary Subjects of this affection, especially those in the habit of covering. Geldings rarely shew this hernia; and M. Girard has never seen it in a mare. One obvious reason for this exemption is the comparative narrowness of the abdominal ring in the female, the round ligament being inconsiderable in volume contrasted with the spermatic cord. The presence of the uterus and vagina, together with the greater elevation of the pelvis in the mare, will also serve to explain this—the bowels in her body being necessarily thrown still more forward against the diaphragm.

Notwithstanding these impediments, however, the occurrence is possible, as is satisfactorily shewn by a case related in *The Veterinarian* for 1830, by Mr. Proctor.

Peculiarities.—This hernia may exist with or without visible tumour; and may either be *acute* or *chronic*, *simple* or *strangulated*, *continued* or *intermittent*. In some cases there exists thickening of the membranes, adhesion of the coverings of the hernia to one another, occasionally to the intestine within them. In other instances hernia is complicated with hydrocele, the tumour assuming another shape and acquiring considerable magnitude. Besides these differences, the hernia may be what is called *latent*, i. e., imperceptible, at least to the view, in consequence of having protruded no farther than the inguinal canal, in which state it is named *BUBONOCELE*; when it pervades the canal and descends into the scrotum, it takes the appellation of *OSCHEOCELE*. Either of these forms may be *recent* or *inveterate*, *reducible* or *irreducible*. Hernia very rarely exists on both sides. It occurs oftenest on the right—a circumstance M. Girard is unable to explain: may it not arise from horses in general being taught to put their right legs foremost, and consequently exert and strain their right sides more than their left?

M. Girard enters into an account of each form of inguinal hernia by a classification of cases under the general heads of *Enterocoele* and *Epiplocele*; and the specific ones of *recent* or *inguinal enterocoele* (properly so called), *enterocoele from castration*, *chronic* or *scrotal enterocoele*, and *congenital enterocoele*.

INGUINAL HERNIA—strictly so called, or *BUBONOCELE*—almost always makes its appearance abruptly, and hastens to become strangulated. Whenever it does happen that the descent is gradual, the gut remains for a time in concealment, nor do we become advertised of its descent until it has made farther progress or given rise to certain disorder.

The Symptoms marking its presence are—indisposition to work, erected head, appetite impaired: pain succeeding, the animal breathes deeply, paws, and puts himself into various postures to obtain relief. There are cases in which the horse appears as if he were languishing from over-fatigue. Now and then the gut returns of itself, and the patient becomes suddenly restored to ease. A second descent, however, commonly takes place, and that—should it likewise return—becomes followed by a third, and so on, until, from the volume it acquires, the hernia becomes permanent. Knowing the usual causes, it becomes our duty, while watching the symptoms, to make inquiries concerning them. At length, the pulse becomes thready; the eyes reddened; the pupils dilated. Inflammation seizing the displaced parts, occasions slight colics, continued or intermittent. Both Mr. Hodgson and

Mr. Molyneux (veterinary surgeons in the Company's Army) compare the symptoms to those of colic; with this difference, adds Mr. M., "that there is no remission of pain." The testicle on the hernial side, though felt drawn up, irregularly descends and ascends: this symptom is highly pathognomonic, and one demanding that the practitioner should, without loss of time, examine into the state of the inguinal canal. In this

Examination, or manipulation, both hands are employed; one being introduced into the rectum, the other into the sheath. The one within the rectum seeks the internal ring; while the other, pursuing the course of the cord on the side affected, is pushed up to the external ring; and thus, in the natural state, the opposed fingers may be made nearly to meet, and the dimensions and condition of the apertures ascertained. However small the protruded portion of gut, the operator will be able to detect the bubonocoele, and even reduce it, by proceeding, *secundum artem*, with such necessary precautions as will be hereafter pointed out. This exploration may be conducted in the standing posture; though it will be prosecuted with more facility and certainty should the patient be cast, which, indeed, is by far the preferable mode of proceeding.

Should hernia be found, and not prove at once reducible, M. Girard recommends to be practised in the following manner

THE TAXIS.—The horse is to be thrown upon the unaffected side; and, with one hind leg drawn and fixed forward, in the same manner as for castration, he is to be turned upon his back, and maintained in that position by bundles of straw, with heaps of straw placed underneath him to raise the croup. With both arms well oiled, or smeared with some mucilaginous decoction, the operator will now commence his exploration, taking care to empty the rectum as he proceeds. Should he find that the gut passing through the ring is neither strictured nor strangulated, he may endeavour to disengage the hernial portion by gently drawing it within the cavity, at the same time aiding its retraction by pushing it inward with the other hand within the sheath. Should he experience much difficulty in that attempt, he is to desist; violence being too often the forerunner of strangulation and gangrene. The practitioner must bear in mind, also, that, although he has succeeded in the reduction, unless this be followed by castration, and that immediate, the protrusion is likely to recur, and may do so even the moment after the animal has risen. Mr. Molyneux recommends that the patient be blooded largely prior to being cast for the taxis, with a view of enfeebling the muscular energy; and, for my own part, I quite subscribe to his practice.

The Feel of the Tumour is soft, more or less voluminous, and elastic and—when the horse is coughed?—salient, or rebounding under the pressure of the fingers, or else it is substantial and weighty. It either fluctuates or pits, according as it contains gaseous or stercoral matters, the latter giving it

at times a solid, irregular, lumpy feel. When the gut is so closely embraced around the neck of its peritoneal sheath that all passage through it is interrupted, the hernia is said to be

Strangulated; an event also indicated by the rapid aggravation of all the symptoms. Sometimes it happens that the gut is merely nipped or pinched at the ring, a swelling being thereby produced about the size of a nut; at other times, sufficient of the gut enters the inguinal canal to admit of the accumulation of matters, stercoral or gaseous, or both, and the consequences are, distention and gangrene.

The Symptoms of recent Strangulation are—aggravated colic, which ceases only with the supervention of gangrene; alternate ascent and descent of the testicle, at first in quick succession, afterwards at longer and longer intervals, until at last the organ continues drawn up—no longer perceptible below. Tortured with pain, the animal lies down and rolls upon his back, and maintains that position—appearing to derive from it temporary relief. While in the erect posture he quite writhes from suffering, and, with his fore feet fixed, crouches almost down to the ground. He breaks out into a profuse sweat; and in that state ends his agony, not by lying down and struggling, as in ordinary enteritic cases, but by falling at once prostrate, a lifeless carcass. In a case that occurred to M. Languenard, and another that happened to M. Girard himself, the spasms were attended by vomiting, and in the former also by rupture of the diaphragm.

HERNIA IMMEDIATELY FOLLOWING CASTRATION—what M. Girard calls *the hernia of castration*—is produced either by the violent struggles of the animal while under the operation, or else appears in the act of rising. In its effects it is essentially similar to the one already described.

SCROTAL HERNIA, or OSCHEOCELE, owes its production to dilatation of the vaginal sheath of the testicle, combined with relaxation of the fibrous tissue surrounding the ring, and is at first mostly intermittent; that is, it disappears during repose, and returns under exercise or exertion; which variable condition continues until such a descent takes place as renders the tumour, from its weight, incapable of yielding to the retraction of the surrounding parts: in this condition its augmentation goes on, until the matters accumulated within the gut produce obstruction, and that becomes followed by strangulation. These changes, so far from being sudden, proceed rather slowly; and accumulation and obstruction always precede strangulation. While the accumulation is going on, we may observe loathing of food, dullness, indisposition to move; also, as the engorgement proceeds, loss of appetite, constipation, borborygma, colic. Strangulation adds virulence to these symptoms, occasioning, as in recent hernia, the greatest distress, until gangrene takes place, and then all pain suddenly ceases, and cold sweats, and shiverings, and convulsions, close the scene.

Strangulation.—Practical observations shew us that old herniæ become strangulated from engorgement, and not from stricture around the neck of

the sac at the ring: that can be considered but as a secondary cause. The circumstance of stricture following, however, accounts for the symptoms of strangulation being in these and the afore-mentioned cases essentially alike; being found to vary only in their succession and rapidity of progress. It may be observed, however, that many horses having scrotal herniæ not only escape strangulation, but continue to do their work with a large tumour swinging between their thighs—Gibson mentions a case in which “the gut extended the scrotum down to the hock”—apparently without any inconvenience from it beyond what may arise from its bulk and weight. This is a fact which argues most strongly against meddling with such tumours unless we be peremptorily called on to interfere.

Diagnosis.—It is not always easy to distinguish scrotal enterocele from other swellings of the genitals, and particularly when the hernia is complicated with sarcocele or varicocele, or thickening of the cord, or a combination of these affections. The tumour of an enterocele does not preserve a general uniformity; it is commonly most bulky next the abdomen, increasing from below upwards: indeed there are cases in which its volume below, little, if any, exceeds that of the scrotum. The swelling yields to pressure, and returns to its form after being compressed. If it be raised up with the hand, it sensibly diminishes in volume, from part of its contents being withdrawn into the abdomen; which retraction sometimes is attended with a gurgling noise. Should it be deemed advisable to examine into the state of the inguinal canal, its openings will be found to be more or less dilated and encumbered; and this is an infallible proof of the existence of hernia.

One Diagnostic more I would add, which seems to have escaped the observation of our learned author; and that is, the self-expansion of the swelling under the effort of coughing. Grasp the tumour with one or both hands, softly but closely, and then let another person cough the horse, and the swelling will be found suddenly to expand under the effort, and as quickly to recede again. Might not this criterion supersede the troublesome business of exploration *per rectum et vaginam penis*?

Morbid Consequences.—In almost all chronic herniæ we meet with serous effusion, either into the cavity of the tunica vaginalis, or into the cellular tissue uniting the hernial coverings. Morbid thickening of the tunics is a much rarer occurrence, and one of which M. Girard has seen but few examples. The comparative rarity of cases of adhesion between the gut and sac in horses, Girard thinks, may be ascribed to the non-employment of artificial pressure, by trusses and bandages, as in man. Mr. Charles Percivall, however, informs me, that the occurrence is by no means so uncommon in India, where castration is much practised at a *late period of life*.

CONGENITAL HERNIA.—This, the most frequent but the least dangerous species of hernia, is an attendant on birth, augmenting up to the third or sixth month; after that diminishing, and ultimately disappearing. Should it continue without lessening in volume for a year or eighteen months, it may

be considered as, and is in fact become, a chronic or permanent scrotal hernia. In case the swelling, however, instead of being always the same, at intervals diminishes, and continues so to do more sensibly as time advances, it will in the end recede altogether; and though it return again at times, still, the relapses growing less marked or frequent, at last the gut will enter the ring no more.

In the Fœtus in Utero inguinal hernia is found. M. Linguenard, V.S., who has practised for twenty years in Normandy, a great breeding country, has ascertained, by a vast number of observations, that *inguinal* hernia is invariably present at birth, even in abortions and in subjects still-born.

After Birth.—Herniæ making their appearance a few days after birth are also to be included in the class of “congenital.” In these cases the gut becomes hernial in the same manner in which it does in adult age: it slips through the peritoneal aperture at the ring, and either drags down the testicle along with it, or else follows that organ in its descent: the testicles in ordinary cases descending prior to the sixth or seventh month. The experienced practitioner abovenamed, M. Linguenard, calculates that about one-fourth of the Norman colts are foaled with *scrotal* hernia; but that in the majority of them it disappears in the course of growth. In the *Recueil de Médecine Veterinaire* for July, 1828, appears the following:—“These swellings (*scrotal herniæ*) occasionally make their appearance in the scrotum of the colt a few days after birth. Sometimes they occupy one side only of the bag; occasionally both are distended. In a few instances the scrotum becomes as large as a child’s head: these are true *scrotal herniæ*. A portion of intestine has descended into the scrotum. Bandages and topical applications are perfectly useless, or worse—producing irritation and pain. At an uncertain period the swelling begins spontaneously to diminish, and at length entirely disappears. When it occupies both sides of the scrotum, it goes back more tardily; and the retraction of one side seems to be quite independent of that of the other.”

Causes.—It is worth while to inquire if the hernia, prior to birth, originate from causes similar to those that occasion it in after age. Certain movements of the full-grown fœtus appear very likely to produce hernia, especially at a time when the inguinal apertures and passes are so lax as almost to invite entry: indeed, both the ring and inguinal canal in the fœtus appear proportionably larger than in the adult, and evidently possess more extensibility. The parietal parts—the fibrous aponeurosis of the abdomen, the borders of the external ring, the dartos, and the cremaster—being all as yet but imperfectly developed, possess little power to oppose hernia. No sooner has the fœtus left the womb, however, than these several parts by degrees acquire strength, until they attain energy sufficient to re-act upon an incarcerated hernia, raise it upwards, and ultimately force it back again into the abdominal cavity, and retain it there. We may now also explain how it happens that these herniæ suffer no engorgement nor strangulation until age

is farther advanced; for then it is that the animal's food becomes of that fibrous substantial character that adds to the volume and weight of the hernia, and in the same ratio operates against its return, and tends to superinduce other more serious consequences.

EPIPLOCELE is a frequent companion of enterocoele, without adding any thing to the importance of the case: indeed, epiplocele of itself is so far from being dangerous, that it has occurred without symptoms either of pain or disordered function. Protruded omentum, without intestine, gives rise simply to a soft indolent tumour in the groin, unvarying in volume, unless it receive additional contents: a circumstance that serves at once to distinguish it from enterocoele. I think I may add to this, coughing, as a corroborating diagnostic. M. Roupp assured M. Girard, that in the course of the practice of castration on cart-horses, he had on several occasions met with hernial omentum, and had invariably amputated the protrusion without the smallest ill consequences.

THE TREATMENT OF INGUINAL HERNIA must be based upon the release or return of the incarcerated viscus. The veterinarian's first concern in these cases is his diagnostic; his next, the due appreciation and scientific employment of the different resources furnished him by his art for the subjugation of the disease. The case however may be incurable, or of such nature as would evince folly and temerity in surgical interference of any kind—at least, of what we understand by an "operation."

While so recent that the tumour is yet only visible at certain times, and the animal's health remains undisturbed, nothing more is commonly done than bathing the animal in some river, or making use of astringent applications or injections. Unfortunately, veterinary surgery has not yet invented any sort of truss or suspensory bandage that can be worn.

Reduction by the Taxis.—A manual operation for the return of the gut, the nature of which and mode of procedure have been already described at page 280, can only be practised with success so long as the ring remains in its natural condition, and while the hernia is recent, and there exists no stricture or impediment to the retraction of the intestine. In a case where the neck of the sac is become enlarged, the reduction, of course, will be readily effected; but it can prove only temporary, unless followed up by the operation of castration, the only means we possess of causing contraction of the canal. If, after a thorough examination of the parts, reduction by the taxis be considered practicable, no time should be lost. Only let the operator remember, that all force in drawing back the gut is to be avoided, otherwise the consequences may be—as they but too often have been—inflammation and gangrene, if not rupture.

AFTER THE OPERATION OF THE TAXIS should there appear any reason to fear a return of the hernia, either from the enlarged condition of the ring or previous habits of colic, M. Girard recommends keeping the animal cast upon his back for some time, to give the gut time to recover its proper place and position; and, after the horse has risen, to put him into a stable so prepared that his hind parts may stand elevated considerably above the fore; also to give him nought but straw and water gruel. He recommends blood-letting, enemata, and fomentations to the belly. In one case, in which the gut had returned several times after reduction, M. Girard succeeded with the T bandage.

OPERATION FOR SCROTAL HERNIA IN STALLIONS. This being the simplest form of operation with the knife, and many of the directions given for it being applicable to the others, our author speaks of it first.

Of these herniæ some are reducible by the taxis; others irreducible: their reduction, however, rarely proves but temporary, the operation of castration (*à testicule couvert*) being required to complete the cure. Furthermore, the hernia may be simple, or it may be complicated with hydrocele, sarcocele, varicocele, and adhesion.

Operation for simple Hernia.—Providing there be no sarcocele, and the hernia be of the reducible kind, there will be no difficulty about the operation. The horse being cast and turned upon his back, the operator will seize the testicle with his left hand and draw it out as far as he can, while with the right he makes every effort to push the hernial viscus back, through the ring, taking care in so doing that he makes his compression *upon the sides* of the tumour. Should there seem to be any unusual obstacle, he may, by giving the testicle to an assistant, employ both hands in the manipulation. The croup should be elevated, that position being most favourable to the return of the hernia: indeed, when the gravitation of the viscera is in this manner taken off, it not infrequently happens that the gut slips up of itself. On one occasion the animal was no sooner turned upon his back than the hernial mass disappeared, drawing with it into the abdomen the testicle; which latter the operator sought afterwards in vain. The consequence was, a necessity to allow the animal to rise again and walk about in order to produce afresh the hernia. This shews the expediency of seizing and retaining the testicle the moment the horse is cast. In some cases it will prove advantageous to draw out the scrotum, it being by compression apt to force the hernia against the ring. We must not have recourse—if we can anyway manage without it—to retraction through the rectum, it being in this case dangerous, and likely to aggravate the malady. Eveloping the tumour in powdered ice, bleeding the patient to a large amount, and the tobacco enema, are

measures of great efficacy, and such as must be had recourse to when minor ones fail of success. The hernia reduced, the operator proceeds to the operation of castration *à testicule couvert*. In this procedure M. Girard sagaciously warns us to take great care in cutting through the scrotum and dartos, lest we open the hernial sac; at the same time to make the separation of the dartos from the sac as complete and clean as possible, in order to give the utmost effect to the clams, which should be fixed close to the ring. Before the clams be shut, let the operator assure himself that no skin—above all, no portion of intestine—be included within their gripe; for the latter circumstance did once happen to an experienced operator (M. Roupp), and gave rise to violent colics, which could not be relieved but by casting the animal a second time, and loosening and placing on afresh the clams. The testicle had better be taken off at the time the clams are applied; the clams then will be drawn up close to the belly, and may be left on until they spontaneously lose their hold. On some occasions curved clams have been found preferable: their convexities being turned towards the ring, the apposition and pressure become both more efficacious.

Thickening of the Membranes will render the dissection of the dartos from the sac both tedious and difficult; and this may exist to that degree—in one case they were found an inch in thickness—that for the clams we shall be compelled to substitute a strong waxed ligature for the compression of the cord, which should be fastened by a running knot.

In the case of Sarcocoele the operator must be guided by circumstances. Should the tumour consist of intestine principally, the operation is to be conducted the same as for thickened membranes. Sarcocoele may render the tumour so firm and compact as to deprive it of every sign or feel of containing intestine; and should the operator neglect to explore the ring, this concealment may lead him into fatal error, in case he might determine on the removal of the sarcocoele. Whenever intestine is detected, he must take care to make himself sure about its return before he ventures to apply either clams or ligature to the sarcocelalous swelling.

Adhesions between the hernial gut and its sack are so rare that M. Girard has seen but one instance of their occurrence; though it would appear, from what has been already stated on the authority of Mr. Charles Percivall, that between the testicle and its vaginal covering they are by no means uncommon. When adhesions of the first kind do occur, it becomes necessary to open the sac in order to destroy them, before the reduction can be accomplished, a case wherein the clams will have to be applied upon the bare cord.

In the cases of Stoppage and Strangulation herniotomy becomes necessary, and must be practised without delay: otherwise, scrotal hernia in general admits of time for deciding on the operation, and for preparation for it by dieting, blood-letting, &c.

After the Operation the veterinarian will, besides enjoining a low and appropriate diet, bleed and purge and administer injections, according as the

case may seem to require. The animal had better stand with his croup elevated, and be tied up so that he cannot lie down.

OPERATION FOR HERNIA IN GELDINGS. That hernia is a disease in geldings of the rarest kind, the veterinary annals of our own country afford ample proof; still, the fact of there being cases on record is sufficient to shew that one may occur to any one of ourselves, and perhaps at a moment least of all expected: though taken by surprise, however, that we may not be taken unprepared as well, it behoves us to possess ourselves of every information requisite for the treating of such an accident.

THE ABLATION OF THE TESTICLE is followed by the enlargement of the end of the spermatic cord, and by its cohesion with the scrotum, down to which tuberos united part the inguinal canal remains pervious, terminating there in a cul-de-sac. By degrees, in the course of time, the tuberosity of the cord diminishes; the cord itself withers and shrinks; its vessels contract, as well as the *vas deferens*, which latter commonly contains a colourless glairy fluid. We learn from M. Girard, that,

In Geldings inguinal hernia takes the same course, is susceptible of the same terminations, and requires the same treatment as in stallions. Trusses and bandages are all ineffectual: a surgical operation is the only means of causing contraction and closure of the inguinal canal. And this consists simply in the application of clams—no cutting being required—upon the outside of the skin, the same as is practised for umbilical hernia.

The Taxis is to be employed, and will be conducted with most effect—the horse lying upon his side—by drawing out the hernial sheath with one hand, while the other is employed in manipulation. Should this mode fail, an assistant may be directed to grasp the hernial mass, and keep it from pressing against the ring, while the operator renews his efforts to manipulate it upward. In some cases it becomes necessary to have one hand within the rectum.

The Clams should be applied immediately after the reduction of the hernia. In putting them on, care must be taken to draw out that part of the scrotum to which the sheath of the vaginal canal is adherent, and to push them up as close as possible to the belly prior to shutting and confining them by ligature.

In the case of irreducible Hernia, we must lay open the hernial sac, and, by the introduction of the finger, ascertaining the nature and situation of the stricture, proceed to release the contained portion of intestine according to the rules laid down for strangulated hernia. After the return of the gut, the

clams are to be applied upon the cord, with the additional precaution that the opening made in the sac be included.

OPERATION FOR STRANGULATED HERNIA.—The intention of this operation is two-fold:—first, to remove the obstruction to the return of the strangulated portion of intestine into the belly; secondly, to set up an obstruction to its descent again into the scrotum. Towards the accomplishment of these objects it becomes necessary—first, to lay open the hernial sac; secondly, to ascertain the seat and nature of the stricture; thirdly, to divide the stricture; fourthly to return the hernia; fifthly, if required, to finish by castration. The instruments, &c., required are—scalpels, straight and curved bistouries and directors, dissecting forceps, curved scissors, clams, ligatures, clam-pincers, sponge, and a pailful of warm water.

The animal being cast upon his back, many advantages will accrue to the operator should the situation afford a beam or a ring or any thing over or through which he can manage to pass the hobble-rope coming from the hind leg of the hernial side, whereby he may obtain the power of extending it at pleasure, and abducting it from the opposite limb. Every thing ready, and the assistants properly posted, the operator retaining the most handy of them in attendance on him, he will extend an incision, begun about opposite to the external ring, down along the middle of the anterior surface of the cord, for the space of two or three inches; at the same time, provided there be no intestine actually within the scrotum, the testicle may be drawn out. The skin being thus divided, the operator will next carefully cut through the dartos, by which he will expose the vaginal tunic, now the hernial sac, which is recognised at once by its dense albugineous texture. The most scrupulous nicety is required in opening the sac, to guard against wounding the gut, and especially when the parts are much distended. The best mode of proceeding is, first, with the middle of the blade, to scrape through some of the exterior fibres, and afterwards, with the forceps, dissect up, layer by layer, until we arrive at the innermost serous layer, immediately enveloping the gut; into this a hole is to be made only large enough to admit the director, by the aid of which, either with a bistoury or the scissors, the opening is to be sufficiently dilated. The incarcerated intestine, evolving under the knife, is now to be drawn out of the sac, and maintained extended by the pressure of a linen cloth moistened with some simple mucilaginous liquid, in order to facilitate getting at the stricture. The operator is then to pass one or two fingers into the hernial sac, and carry them onward to the seat of stricture, against which he must keep them steadily maintained, so that they may serve as a

director to the probe-pointed bistoury, which is to be passed flatwise along them, with its edge turned outwards, and thus insinuated within the stricture. Being certain that the bistoury has passed the neck of the hernia, he has nothing further to do than to turn its edge forwards, still keeping it inclined outwards; and immediately he finds the stricture divided, the liberated gut slips back into the belly, either all at once or by degrees. Some cases will be found to require an extension of the incision, or some further division of the stricture: much discretion, however, is requisite in these secondary cuts, inasmuch as the return of the hernia is always to be less apprehended after *small* incisions. Should the gut not spontaneously recede, a little dexterous manipulation may accomplish its return: it will never be required, however, to pass the hand into the rectum.

M. Renault mentions two cases which occurred to him in 1836, in illustration of this operation.

In the first he practised herniotomy, as described and recommended by Girard. He cut through and turned up the scrotum and dartos, and then penetrated with caution into the hernial sac, in which he found nearly two feet of intestine. He unravelled it, and gave it to an assistant to hold while he divided the ring; which done, with great difficulty he returned the whole into the abdomen. A clam was then applied upon the cremaster, and M. Renault congratulated himself on the fortunate termination of the operation, when the animal making a sudden plunge, the intestine again escaped through the ring, separated or tore the fibres of the cremaster above the clam, and protruded quite as much as before. The intestine was once more returned, and the lips of the scrotal opening held together by the continued suture; but all hope had now fled: the animal died a few days afterwards.

A novel Operation.—As the above accident might often occur—it not being in the power of the operator to prevent it—M. Renault conceived a notion, in a case where the strangulation was recent, the hernia not large, nor the tumefaction great, that it would be better to make an incision at the upper part of the flank, by the side of the hernia, and to endeavour manually to return the gut, even though it should have descended into the scrotum: nothing, then, would remain for treatment but a wound into the abdomen; and surgical experience has shewn us that simple incised wounds, like this, may be generally managed. It is true that the method has proved in one case unfortunate; but then, there were two strangulated herniæ present; strangulation had existed twenty-two hours; and more than two feet of small intestine had entered the scrotum, and this was already distended with gas.

The Bowel being returned, the propriety of castration is to be decided on by the states of the cord, epididymis, and testicle. Should they be engorged, livid, and marked with purple spots, the operation becomes indispensable; because it may, performed in time, prove a preventive of congestion, perito-

nitia, and gangrene. It is to be practised only on the side affected, and in the ordinary manner, with the clams, *à testicule couvert*. Under other circumstances, although the parts may evince compression, still, so long as there be no signs of mortification, castration is not called for.

After the Operation, the animal is to be retained down, as prescribed after the reduction by the taxis; only the limb drawn up to the beam may have a little liberty given to it, and thereby the body allowed to incline somewhat to the opposite side (to that operated on), which will give the animal some relief. Every precaution is to be taken to prevent him from struggling or flinging about at the time he is released to rise up. He will require the same subsequent care and treatment as has before been detailed in speaking of the operation for chronic hernia; only observing that this is a case in which relapse of the hernia is more to be dreaded.

Result.—By the chirurgical means stated, we can at all times succeed in reducing the strictured hernial viscus; but the result can prove favourable only in cases free from sphacelus: whenever the hernial production has become gangrenous, the operation can neither prevent, arrest, nor retard death; an event which commonly happens some hours after the reduction. In man, in many cases, we can establish an artificial anus. And indeed, afterwards, by Dupuytren's procedure, sometimes succeed in again restoring the natural passage. It is submitted, without conceiving it necessary to state the reason, that such practice is not available in the horse. This teaches us that the operation for a recent strangulated enterocele cannot be delayed but with the utmost danger. In fine, a gut once strangulated becomes the seat of pains rapidly augmenting, and ending in the production of most violent efforts; the stercoral matters, forced onward by the peristaltic motion, accumulate within the portion of gut incarcerated in the inguinal canal, adding aggravation to the case. The parts, so swift to take on gangrene, are most urgent in calling for relief; which can be given in no other way than by setting them free from strangulation.

When the testicle is not removed, the aperture in the scrotum is to be closed by suture. Commonly, adhesion follows this operation, between the testicle and its vaginal tunic. M. Girard relates a case in which, from the incisions being too freely extended, the operation—which was finished by castration *à testicule decouvert*—was speedily succeeded by *eventration*, or the escape of the intestines, whose ejection augmenting at every successive heave, became at length too voluminous to admit of the possibility of return. In another case, laceration of the stricture happened at the time the fingers were introducing underneath it, and thus its divi-

sion by the knife became superseded: this is an event, however, not to be desired, much less promoted.

OPERATION FOR THE HERNIA OF CASTRATION.—

If one might venture to direct attention to one part of the important subject of hernia in preference to another, to a practitioner in England, it would be the section now coming under consideration. Some sad occurrences are yet fresh in the memory of many veterinarians, which, were they to recur in the present advanced state of veterinary science, might not have the same unfortunate issue: at least, not in the hands of such among us as have evinced the good sense—a duty incumbent upon us all—to make themselves as well acquainted with this as with the other branches of their profession.

THE ENGLISH METHOD OF CASTRATION is of that nature that is converted by the presence of hernia into an operation pregnant with difficulty and danger. There is difficulty in prosecuting the operation, should its prosecution under such circumstances be determined on; and there is danger not only at the time of the operation, but after it is finished. In a prediscovered or even suspected case of this kind, it is far better that we should relinquish our own and betake ourselves to the French method of performing castration—to that which by them is called *à testicule couvert*. The hernia being reduced, the wooden clams are to be applied upon the vaginal covering of the spermatic cord, and secured as close as possible against the belly; special care being taken that no knuckle of intestine is left included within their gripe.

Even in a case where the vaginal tunic has been opened before any discovery of the hernia happened to be made, after having effected the return of the gut, instead of prosecuting the operation according to the English fashion, it is advisable to have recourse to the French plan, and to endeavour to finish the operation still *à cordon couvert*, by detaching the vaginal tunic from its connection with the scrotum, and extending it afterwards upon the cord, so that it may become included, together with the cord, within the clams. Cases do unfortunately occur, however, in

which, owing to the impetuous descent of the hernial gut the moment it becomes liberated from its confinement within the vaginal tunic, all our efforts to return, or even restrain the protruding bowel, prove unavailing, counteracted as they continually are by the struggles of the animal and the contractions of the abdomen.

In such perilous and embarrassing circumstances, it is not without danger we resort to the expedient of introducing the hand into the rectum to aid the reduction, which should always be most actively prosecuted during the time the animal is most quiet. Should every varied effort at reduction prove unsuccessful, the patient must be bled as he lies; after which we must try the effect of emollient mucilaginous fomentations to the bowel. It would also be well worth our while to make trial of the tobacco enema. All these means failing either to abate suffering or sufficiently relax parts to render our renewed efforts more successful, the case may be regarded as hopeless.

In a case of strangulation, the stricture, of course, must be divided; though even this is a proceeding which does not always answer. When the abdominal contractions are strong and frequent, dilatation of the ring serves but to facilitate the descent of the bowels, and the hernia in consequence rapidly becomes a voluminous mass, whose return is altogether impracticable.

The reduction effected, we should immediately set about dissecting the vaginal tunic away from the dartos and scrotum, that we may be able to draw it over the cord, and clasp both within the clams, which are to be applied and secured in the manner directed for castration *à testicule couvert*. This second compression must be made higher, if possible—certainly not lower, upon the cord than the former—by the clams already applied for castration. When this high compression cannot be obtained with the clams, a ligature may be used, one advantage of which is its admitting of being fastened still closer to the ring.

Two cases occurred to M. Rey, of Castres, in which this practice of M. Girard's proved completely successful. In both, the hernia made its appearance during the operation of castration, after the application of the clams. In one he succeeded in reduction without disturbing the clams; and all he did further was, to sew the scrotum to the vaginal tunic of the cord. In the other case he had to remove the clams to accomplish the reduction; but afterwards he replaced them. The suture has the effect of a temporary suspensory bandage, besides that of inducing inflammation and its desired consequences, effusion and adhesion between these parts, and consequent obliteration of the inguinal passages.

Whatever advantages as a summary operation, and one that requires no after surgical interference, the English may seem to possess over the French method of castration, it must be admitted

on all sides, that, where hernia is concerned, one is dangerous, and may prove fatally so; while the other is not only comparatively safe, but affords a good prospect of proving an effectual cure for the rupture.

UMBILICAL HERNIA.

The protrusion of any portion of bowel through the navel, forming a tumour at that part, is what we understand by *umbilical hernia*, or, as it is technically expressed in one word, by *exomphalus*. The umbilicus or navel of the young animal prior to birth is open for the purpose of giving passage to the umbilical cord or navel string: speedily after birth, however, closure of it takes place, as well as obliteration of the vessels of the cord. Should this closure not happen in due season, a portion of omentum, or knuckle of intestine, or both, is very apt to get pressed into the aperture, and, for a time, to become imprisoned therein; thus constituting the hernia in question. I have not been in the way myself of seeing much of these accidents, although they must be common enough in large breeding establishments; I shall, therefore, betake myself for information to Hurtrel d'Arboval, and such British writers as have published on the subject.

We learn from d'Arboval that *exomphalus* may either be congenital or accidental. The first is observable at the moment of birth, or speedily after. In the latter case the protrusion arises from the yielding, even after the navel is once closed, of that still lax and weak part to the depression of the viscera; a failure to which the animal is liable even up to his third year. The tumour at the umbilicus is soft, either oblong or flattened, and susceptible of augmentation on any violent effort; and, within the skin, possesses a sac. When omentum only is protruded it has a doughy feel, wanting the elasticity conveyed by contained intestine. The intestine displaced is a portion either of the cæcum or colon; those being the lowermost guts. There is nothing dangerous about this hernia. Sometimes, indeed, though rarely, it will disappear again of its own accord: when it does not, it may give rise to occasional colic, as well as incapacitate the animal for any kind of work; or it may augment in volume, and so become dangerous. On these accounts we ought not to trust wholly to nature for a cure.

The diagnostic between contained omentum and intestine is not always easy, and particularly when the tumour is but small. Nor is it of any great deal of consequence; our object being, whatever the hernial substance, to return it into the belly.

Reduction.—The animal having undergone preparation some days beforehand by a suitable diet, is to be cast, turned upon his back, and while supported in that position, have his hind legs bound together, and his fore legs likewise; and afterwards, have them, thus bound in pairs, extended apart from each other, in order to afford space for the operator, and facilitate the return of the hernial viscera. The taxis is now to be practised *secundum artem*, drawing out the skin at the same time that manipulation is practised to push up the hernia. The reduction effected, the skin is to be again pinched up and drawn out, and confined in the fold into which it is drawn either by clamps placed upon the sides of the fold, or sutures run through it, as close as possible to the surface of the belly. The clamps should be of extra length, and not squeezed so tight as to endanger sloughing of the included skin. In regard to the suture, some prefer one sort, some another; probably an imitation of what is called the cobbler's or saddler's stitch would afford the most security.

Of Fistulous Umbilical Herniæ, and consequent artificial anus, the novel and interesting case is placed on record by Mr. Dick, in *The Veterinarian* for 1833. The horse, four years old, was bought by Mr. Dick at Kinross Market, with a considerable enlargement of the umbilicus upon him. He did his work for some time, but it was with stiffness and unwillingness. Shortly afterwards he was seized with a "ting," and a farrier was sent for, under whom he got better. He was put to work again, but proved still stiff and unwilling. Shortly after, "an opening formed at the navel, by which the whole of the fæces were passed off." Mr. Thomson, V.S., Redstone, was sent for, who "stitched up the opening, which was large enough to admit a person's fist, and applied a roller with a pad of tow over it, also occasionally adhesive plaister." "Adhesion took place, and granulations formed very rapidly for some time; but a very small opening remained, which seemed extremely obstinate, yet was making a little progress, and to all appearance would have been entirely closed in a short time"—when he died. The intestines proved in many places perforated by ulceration, apparently the effects of lumbrici. There seemed to be no disease about the umbilical opening, except adhesion between the intestines and the parietes of the abdomen. I found it to be a part of the ileum that had fallen into the opening, about a foot from the cæcum. Nature had formed a tube of about two inches long, quite distinct from the ileum, by way of a rectum; but when it was a good deal healed up, air seemed to be sucked in by it, and passed off *per anum*. In drinking, the water passed off by it without any of the aliment being mixed with it: it seemed almost as clear when passed as when drunk. If he got the benefit of his meat, he received no benefit of his drink, for it passed off as fast as he drank it; and from this cause, apparently, he became very much emaciated." During the time Mr. Thomson attended him he shewed no symptom of disease, save a slight attack of gripes. Before death the wound became reduced to the size of a quill, discharging white mucus, but no fæces.

He was allowed only two pints of water a-day, with some pea-meal, with a small quantity of hay. When Mr. T. first saw the horse, he gave a clyster of water-gruel, which occasioned much inconvenience, "seemingly by emptying the posterior bowels too much, as flatus passed, seemingly, from the orifice of the anus, and he worked like a pair of bellows for four hours." Mr. T. then injected a solution of sulph. zinc at the orifice, which caused griping pains for a short time; but they did not recur, although this was afterwards frequently repeated.

Analagous to the above operation in principle, but simpler in application, is one that has been practised with great success by Mr. Pattie, Yoker, Glasgow. His account, in *The Veterinarian* for 1836, of his mode of operating, is—"The colt is not cast, nor submitted to any restraint beyond that of having his head held. The hernial tumour is emptied by forcing its contents into the belly; the loose integument forming the pouch is gathered into the left hand, while the right surrounds it by a ligature placed as closely as possible to the abdominal parietes, and drawn sufficiently tight to interrupt the circulation. On the second day there is considerable tumefaction around the incarcerated integument, which also in a slight degree partakes of the engorgement, feels cold, and often clammy and moist. When the ligature has not been sufficiently tight, or the pouch so large as to require strong compression for arresting the circulation, it is hot and tender. In all cases more than one ligature is necessary. Generally on the third day the first cord is loose. The circle it embraces has been reduced, partly by absorption and partly by incision, and there is no longer any compression. If neglected after this the tumour rapidly increases in size, and is attached by a neck whose diameter is limited by the ligature. It is necessary, therefore, to see the patient twice or thrice a week, to renew the ligature. The second, third, or fourth, should so many be required, must be placed above that which preceded, and close to the abdomen. They relax in from two to three days, and are then useless, save for the purpose of supporting those which follow. The whole drop off, along with the tumour, in from ten to twelve days. The place from which the pouch is detached is neither raised nor excavated. It is a flat granulating surface, as large as a halfpenny, and seldom broader than a half-crown. No further treatment is required, save, perhaps, a little astringent lotion to hasten cicatrization, or an ointment to exclude flies."

VENTRAL HERNIA.

THIS appellation applies to bowel protruded through any part of the abdominal parietes—the navel excepted—the consequence of which is a tumour somewhere upon the external surface of the belly. Ventral hernia essentially differs both from inguinal and umbilical herniæ in the circumstance of the protrusion occurring—

not through any natural aperture, as in both those instances, but—through some incidental breach in the parietes.

CAUSE.—This breach is the result of laceration of some of the muscular or tendinous fibres composing the parietes of the abdomen, in general occasioned by a kick from another horse, or by a blow of some sort.

THE COMMON SITUATION of the rupture is against or rather a little behind the borders of the false ribs, amid the fleshy fibres of the internal oblique and transverse muscles. The obvious reason for its more frequent occurrence in this place, is the prominence and exposure of the part, and consequent greater liability to receive kicks and blows.

THE TUMOUR, in magnitude comparable commonly to a small apple, has a soft, puffy, elastic feel, and by pressure can be made to disappear, its contents being in general readily returnable into the cavity of the belly, and the breach itself often being of sufficient breadth to admit of the skin—which becomes loose after the reduction of the hernia—being also pushed into it upon the ends of two or three of the operator's fingers: in which case the borders of the breach or opening through the abdominal parietes can be, with the fingers, distinctly traced. These signs, however, are, on occasions, as remarked by Hurel d'Arboval, observed by accompanying effusion into the surrounding cellular tissue; at least, so long as that continues.

NEITHER PAIN NOR INCONVENIENCE, nor ill consequences of any sort, *commonly* result from ventral herniæ. Horses having them do their work and maintain their health quite as well as others; nor does general experience warrant us in assigning other danger to them than such as may arise from their liability to fresh injury, particularly from the spur of the rider. I have known hunters so affected, and apparently nothing lessened in intrinsic worth by it. I have known troop-horses similarly ruptured, that have, without any surgical aid whatever, done their duty to the last, without any sensible alteration in the tumour itself, or the remotest sign of colic or abdominal disturbance of any kind, during their lifetime. Notwithstanding this general exemption from inconvenience even, much more from pain or danger, still cases may

and do occur in which from the volume or situation of the tumour, or from its liability to become strangulated, it may be not only advisable but incumbent upon us to perform some operation, or at least to take some measures towards keeping the hernia permanently reduced.

THE CONTENTS OF THE TUMOUR consist of a knuckle of intestine: the omentum is too short to become protruded, unless it be dragged posteriorly towards the ribs. Commonly, I believe, ventral herniæ possess no proper sac, the peritoneum becoming ruptured by the blow which produces the eventration: indeed, in most instances, their only covering appears to be the common integuments.

TREATMENT.—In the generality of cases there is no necessity, or call whatever for adopting any kind of treatment. Still it is right we should know what can be done; for, as I said before, now and then a case presents itself requiring remedy. Providing the accident be recent, the subject young, and the breach but small, there appears a prospect of success by the use of a common circingle, made broad, and placed backward enough to confine a pad of tow or folded linen upon the part, after the hernia is reduced. Success, however, by such simple means must entirely depend upon their judicious application and long continuance. Should the volume of the tumour or intractability of our patient be such as to render such means inapplicable or unavailing, Hurtrel d'Arboval recommends us to pinch up the loose skin covering the hernia, after it is reduced, into a fold, and apply long clamps upon it sufficiently compressed to maintain the fold without running the risk of obstructing the circulation: the same procedure, in fact, as is recommended by him for umbilical hernia. Mr. Ions has adopted this plan of cure with good success.

In April 1839, a bay filly was brought to his establishment, at Waterford, who had received an injury two months before from the horn of a cow between the cartilages of the false ribs, inclining to the flank. The opening was six inches in length. No inflammation ensued, and Mr. Ions felt inclined to try what pressure would do. Mr. I. first returned the intestine, and then placed a pair of castrating-clamps over the skin and pouch, and had the parts kept wet with a solution of nitre. In a fortnight the whole sloughed away, leaving

only a thick cicatrix the length of the clam. During the latter part of the time a solution of sulphate of copper was used. The filly is now at grass, perfectly sound.—*Veterinarian for 1839.*

Mr. Simonds, V.S., Twickenham, has adopted the same plan of cure as has been practised with such happy results by Mr. Pattie, in umbilical hernia, viz. *ligature*. The following case will illustrate his mode of procedure, at the same time that it evinces the complete success by which it has been attended:—

A mare, in leaping some hurdles, forcibly struck her right flank, the result of which was a rupture. Several months afterwards Mr. Simonds saw her, and purchased her for experiment. "The tumour measured eight inches in circumference at its larger and upper part, and in length ten inches, tapering to a somewhat rounded point. It was situated directly in the right flank. It could easily be pushed back into the belly, and appeared not in any way to interfere with her health, or capability for work. She was, however, noticed to be generally resting upon the leg on that side. She having been prepared by venesection, physic, and diet; and having satisfied myself that there was no adhesion between the gut and integument, I pushed back the intestines, and, grasping the sac with my right hand, I desired my assistant to pass a strong waxed cord around the base of the sac, as near as possible to the body, and to draw it as tight as possible and secure it. She seemed to suffer a good deal for a short time. In a few days sloughing had loosened the first, and rendered a second ligature necessary, and after that a third. In three weeks the parts had healed, leaving very little appearance of rupture; and the opening which remained gradually diminished. She was shortly afterwards put to post work, at which she continued, to our knowledge, three years."

FIRING AND BLISTERING have found an advocate in Mr. Horsburgh, V.S., Castleton, N.B. His case, from which I take the following account, is contained in *The Veterinarian for 1838.*

In July 1835, a grey horse, the property of Mr. Laing, farmer, of Pardivine, in breaking out of a park, staked himself on the fence, and was with some difficulty got off. He was much hurt; fever took place on the third day: on the fourth Mr. Horsburgh was sent for. The abdomen and chest were much swollen. The fever was reduced by venesection and purges, and from the swelling, a few days after, fluid was let out by puncturation. The general tumefaction disappeared, but left a swelling in the left iliac region. Mr. H. was in doubt whether it was hernia or abscess. He thought the latter, and punctured it. Bloody fluid escaping, Mr. H. thought he was right, and there-

fore enlarged the opening a little, when intestine protruded. The opening was immediately closed with pin and tow. No ill consequences resulted; the wound healed, the swelling subsided, and nothing remained but the hernial sac, measuring ten inches in length and seven inches in breadth, and protruding to the extent of four inches. The horse being perfectly healthy, his owner would not consent to any operation; until, one day, symptoms of strangulation being apparent, he grew frightened, and gave the case up to Mr. H. Of the symptoms of strangulation he recovered; and therefore Mr. H., having duly prepared him by physic and regimen, put in practice the operation he had at first proposed. Both the abdomen and hernia became considerably reduced by the physic and regimen, which latter consisted in nothing else but as much boiled barley as Mr. H. thought would keep life in him. Mr. H. first fired the tumour through its whole extent, in lines about an inch apart, and pretty deep, and then applied a strong blister, continuing the same restricted regimen until the wound was healed. It was then a little larger than a person's hand. Mr. H. repeated the firing and blistering. The result fully answered his expectations. The horse has stood the test of two years' work, and only on minute inspection can the lines of the firing be seen. Mr. H.'s object in the operation was to excite such an inflammation as would extend to the inner parts, and cause adhesion of the intestine, and so prevent its protrusion through the aperture.

A CASE OF VENTRAL ARTIFICIAL ANUS was, in 1837, sent to *The Veterinarian* by Mr. Karkeek, V.S., Truro, which, although of chronic character, from the summary manner in which it was cured and disposed of, cannot fail to prove to us highly interesting.

"Two years since a pony mare received an injury from the horn of a bullock on that portion of the abdomen situated between the cartilages of the false ribs, inclining a little to the left side, producing a ventral hernia about the size of a cricket ball." From a kick received upon the place from the toe of the shoe of a boy, very serious injury resulted, which terminated in an opening through the lacerated muscles into the colon itself; "being that portion of its second flexure which forms the upper and anterior arch, and the liquid and pulpy contents soon issued freely from the aperture. The mare continued for three weeks in this state, when I was requested to examine her—about the 6th of January. I found the opening nearly large enough to admit my four fingers, and it had a very unhealthy appearance. The discharge of pulpy and watery food was great, and the smell very offensive; so much so, that it was with difficulty any person could be found to attend her. The pulse was between 50 and 60, and the appetite tolerably good."—The mare being with foal, and an old favourite besides, her owner was very desirous to have something done. There were two favourable circumstances—the length of time

since the injury, and the absence of inflammation.—“Having cleaned the wound,” says Mr. Karkeek, “I closed the opening with a strong suture of pack-thread, with a common packing needle, taking in as much of the integuments and abdominal muscles as possible. I then applied a pledget of tow soaked in a solution of chloride of lime, and supported the whole by means of a thick woollen bandage, laced along the spine. I ordered the wound to be cleansed and the solution to be applied every morning, and her head to be tied to the rack, to prevent her lying down. About five weeks afterwards, being in the neighbourhood, I called to inquire after my patient, when to my surprise I found her alive and well, the wound having completely healed. Had this case happened nearer my residence, I should have endeavoured to have instituted some experiments with regard to the process of digestion on different kinds of food; and this, I believe, might have been done without endangering the life of the animal, as there was a copious discharge of food for three weeks previous to my attending the mare.”

IN CASE OF STRANGULATION, the operator would, of course, first proceed to the employment of the taxis, and use every manual dexterity and other aids to render it effectual. Should all his efforts fail, he must expose the hernia by simple incision through the skin, and with his probe-pointed bistoury incise the border of the constricting aperture, making his incision in the direction in which the muscular and tendinous fibres in the vicinity run, as is prudently added by D'Arboval. The gut returned, the wound in the skin should be carefully closed by suture, and a compress and roller, if practicable, kept applied over it.

I shall close this division of my subject with the transcript of a case related in *The Veterinarian* for 1839 by Mr. Simonds, together with an account of an operation for it which reflected the greatest credit upon him and the professional gentlemen present.

The subject was an aged black mare, which was brought to Mr. Simonds' infirmary October 18, 1837, with an old injury, received, he was told, from her falling in the shafts of a loaded cart.—“The most extensive rupture Mr. S. had ever seen presented itself on the left side. The sac formed by the skin, which was not broken, not even the hair rubbed off, extended as far forward as the cartilages of the false ribs, and backwards to the mammæ. A perpendicular line drawn from the superior to the inferior part of the tumour measured more than twelve inches. It appeared, from its immense weight and size, as if the larger part of the colon had protruded.” There was little or no constitutional disturbance. She was bled; a cathartic given; and the tu-

mour constantly wetted with cold water, and supported by a bandage. The next day Mr. S. submitted the case to Messrs. Morton, Spooner, and Youatt. They urged Mr. S. to return the protruding viscera, and secure that return by operation. On the 24th she was operated on. Opium was given to lull sensation and pain,—a dose of *3iiss tinct. opii*. She was cast and secured, and propped upon her back by straw. Her head was made fast to a ring in front, and one hind leg was fixed to another ring. The effects of the opiate were manifest throughout the operation. “After a careful examination, externally as well as per rectum, in order to ascertain the situation and probable size of the laceration of the muscles, an incision was carefully made through the integument into the sac, in a line with the inferior border of the cartilages of the false ribs; which incision was seven inches in length. This, as we had hoped, proved to be directly upon the aperture in the muscular parietes of the belly. The intestines were exposed, and, after having sufficiently dilated the opening to permit the introduction of the hands, they were quickly returned, portion after portion, into their proper cavity, together with a part of the omentum. At times it required our united strength to prevent the escape of the intestines, and which was only effected by placing our hands side by side, covering and pressing upon the opening. By these means we succeeded in keeping in the viscera until we were satisfied that we had replaced them all within their proper cavity. A strong metallic suture of flexible wire was then (by means of a suitable needle) passed through the edges of the laceration, taking in the peritoneum and portions of transversalis, rectus, and internal abdominal muscles, and other sutures embracing the same parts were placed at convenient distances, so as nearly to close the aperture. Two sutures of smaller metallic wire and three of stout silk cord were then passed through the external abdominal muscles, and their aponeurosis, which effectually shut up the opening. The integument was then brought together by the interrupted suture, taking care to bring out the ends of the other sutures. The operation occupied rather less than an hour, our poor patient being occasionally refreshed with some water gruel.” After she was risen, a compress and suspensory bandage that could be tightened at pleasure, were placed upon the wound. Next day the sac which had contained the hernia was filled with serous effusion. A dependent opening was made, from which three or four pints escaped.—26th, Suppuration.—30th, Enabled to walk out; skin sutures came away.—November 4th, Sloughing, in which three metallic sutures came away. A sinus formed towards the mamma through which tape was passed. The appetite up to this time had been tolerably good, and the pulse had ranged between 52 and 56.—6th, So far recovered as to be turned into a paddock for a few hours.—11th, “An accident occurred which nearly brought my hitherto successful case to a fatal termination. She had got into a pond which lay at the bottom of the paddock, and was fixed in the mud; and was, when we arrived, making violent efforts to release herself. After much difficulty she was dragged out, so much exhausted as to be inca-

pable of rising. A gate was procured, and upon that, well covered with straw, she was by two horses drawn home. She had now every attention paid her, and was raised in slings for support. In this 'cradle' she stood quite at ease. She gradually recovered her strength; but it was not until twelve weeks after the operation that the metallic sutures came away; a fact shewing the advantage of these over other sutures—the different degrees of irritation produced on the living animal fibre by the different substances we employ as sutures. To the use of the metallic sutures I attribute the success of my case; and for their introduction we are indebted to Mr. Spooner. My patient shortly after this went to work on my farm, where she continues to the present hour, doing her full share of labour."

This was from the beginning, and all through its course, truly a formidable case. The only question concerning it, in my mind, arising is, whether or not a simpler operation might not have proved effectual?—such an operation as the French veterinarians perform, or as Mr. Horsburgh, with the aid of starvation, succeeded by? I cannot, of course, be supposed to be offering an opinion on a case I never saw: I am but holding these simple operations out as worthy of trial in preference to formidable and dangerous ones.

DIAPHRAGMATIC HERNIA.

AMONG the reasons assigned by Girard in his inestimable work on hernia for the prevalence of that affection in men in comparison with animals, is adduced, the oblique inclination, forwards and downwards, of the axis of the abdomen in the quadruped, the consequence of which is, the continual gravitating tendency of the abdominal viscera against the diaphragm. This visceral pressure, particularly when the bowels are full, must operate, by the impediment to the action of the diaphragm it cannot fail to occasion, in rendering the muscle more liable to rupture or laceration under violent efforts of body or of respiration; and when once a breach has taken place, the same inclination to roll forward will render the insinuation of some viscus—intestine most likely from being the most loosely attached—a highly probable consequence. Such is the pathology of phrenic or diaphragmatic hernia. It is possible for the hernia to happen through some *separation* of the fasciculi of the muscle, or through *dilatation* of some one of the natural

passages through it; though veterinary annals, that I know of, furnish no such cases.

THE SYMPTOMS, when this hernia has happened, have been found to be—as indeed might have been expected—a compound of those of ruptured diaphragm and other painful herniæ; and by accurate observation of these combined expressions of suffering must the case be made out. There will be symptoms of violent colic; at the same time there will probably be some extraordinary agitation in the respiration—some working of the flanks, more like broken-wind, perhaps, than common violent breathing. Mr. Sewell informs us that in this complaint “the horse usually sits upon his haunches like a dog,” a posture in which the intestines may, as he very justly remarks, roll back again from out the chest into the belly: cases, however, that have been published do not appear to substantiate this observation. On the contrary, Mr. Daws says, in rupture of the diaphragm, “he has generally seen the horse push his chest on the ground, and not sit upon his haunches.” Vomiting has been known to be present.

THE HERNIA MAY NOT HAPPEN UNTIL SOME TIME AFTER THE RUPTURE.—A very interesting case, published by Mr. Cleaver, V.S., in *The Veterinarian* for 1836, seems to shew this.

The mare, the subject of it, had been hunted with the fox-hounds three weeks previously to her attack, carrying fourteen stone, and had fallen quite exhausted at a fence. She was in the field once after this, but had little to do. On the day of her attack she had been ridden gently for seven miles. She did not sweat on her return, neither was any fault found with her going. And yet a few minutes afterwards an attack of violent apparent colic set in. Mr. Cleaver viewed the case as one of intus-susception, and very judiciously proposed, as a dernier remedy, that she should be bled to *syncope*, which was done by letting the blood flow in a full stream as she lay down. Presently she broke out in a cold sweat, and after lying quiet for about ten minutes, after several attempts got up. Her flanks worked violently; she rocked, her legs tottered, she stood trembling for a minute or two, and then dropped as she if had been shot. “*There was the most violent and peculiar lifting of the chest*” Mr. C. had ever seen. She died in less than five hours after the attack. “An opening was discovered in the left side of the diaphragm, through which six yards and a half of the small gut were drawn into the chest; and the gut was so firmly strangulated, it could not be moved either way without danger of breaking. One part of it adhered to the posterior part of the diaphragm. The intestine

within the chest was in the highest state of inflammation. The mesentery was torn in several places. There was also a tumour on the mesentery which contained about a pound of dark coagulated blood; about four quarts of blood were likewise effused within the chest, which had flowed partly from the various lacerations, but principally from this tumour.

THE HERNIAL PARTS consist commonly of intestine; and of the small, from their loose attachment, more frequently than the large. In Mr. Cartwright's case the cæcum had entered the chest; and in another, a portion of mesentery was found there. In chronic cases the hernial bowels have been known to contract adhesions to the membranes in the chest.

STRANGULATION happens occasionally in diaphragmatic as in other herniæ. It may speedily follow the incarceration, or it may supervene after many weeks or even months, in consequence of some change having taken place in the volume or position of the viscera. Violent inflammation results from constriction, and mortification follows.

BOTH RUPTURE AND HERNIA OF THE DIAPHRAGM may exist, and yet the horse appear unaffected by any disease—nay, in perfect health. Various circumstances tend to this result, the chief being, the portion of the diaphragm that is ruptured, the extent and direction of the rupture, the viscera received into it, their state of constriction. Laceration of the superior or fleshy part of the diaphragm, where the crura are attached, is suddenly fatal; but in the inferior or tendinous part, considerable rent may exist without materially disturbing the respiratory functions. Mr. Sewell has satisfactorily demonstrated these facts; Mr. Cartwright's case, related at page 149, is likewise illustrative of the same.

REMEDY.—I am afraid we possess none for so distressing a case, even supposing we were adept enough in practice to make the case out. Unless with D'Arboval, we feel ourselves warranted in making an incision into the left flank, and through it manually exploring the inside, and afterwards taking such measures as seem to be required. The animal *may* survive such an operation; the disease he cannot.

SECTION XII.

DISEASES OF THE PERITONEUM.

PERITONITIS | ASCITES.

PERITONITIS.

THE peritoneum is the membrane lining the cavity of the belly, and by reflection furnishing a capsule or external covering, partial or complete, to every viscus therein contained. By *peritonitis* is implied, inflammation of this membrane. Compared with many others, this is a disease that happens much less frequently in horses than in men—perhaps on account of the opposite habits of living pursued; though, when the membrane does take on inflammation, as in men so in horses, unless injury of some sort be the cause, the chronic form is more apt to prevail than the acute.

ACUTE PERITONITIS, indeed, is but a rare occurrence: almost the only well-marked cases we see of it—barring such as are occasioned by incidental injury—being those that originate from the operation of castration. I do not mean to deny that such cases may happen from the application of cold to the surface of the body while heated, from the imbibition of cold water under similar circumstances, and so forth; but I do mean to contend that such occurrences are very uncommon. It is a great deal more likely to arise from some mechanical injury—from a puncture in the belly, or from overstraining the body in acts of galloping or leaping; and this accounts for its presence in hunters that die “over-marked,” two or three examples of which have come under my notice. Surgical operations whose performance necessarily involves or endangers the wounding of this membrane, are also likely to be followed by inflammation of it: among these, castration, from its frequency, as I said before, stands foremost; but to the same list may

be added the operations for strangulated hernia, stone, tapping the bladder, &c. Peritonitis, says Professor Vatel, is a serious consequence of castration; for it is rapid in its progress, difficult of arrest, and if not arrested, almost sure to end in gangrene. It may occur in every period of convalescence, as late as the twelfth day after cutting, and even later. Its prime causer is cold.

THE SYMPTOMS of acute peritonitis are many of them common to enteritis and colic, and other abdominal pains and irritations; though, if we may judge from his mode of expressing them, I should say the animal's sufferings were not in general so great as in the two first-mentioned diseases. The horse paws, crouches, looks at his flank every now and then; at length lies down, and, while down, stretches himself out and groans, or else rolls upon his back; he cannot bear to lie in a posture which compresses his belly; nor will he suffer any one to press hard against his sides or abdomen without cringing and flinching, and at the same time turning round to bite at the person. The belly is distended and tympanitic; the bowels costive; the pulse small, hard, and quick; the skin dry and rough-coated; the extremities cold. In the height of the disorder the respiration becomes short, quick, and painful; and he sighs in his breathing as if, in consequence of the soreness of his belly, it hurt him even to heave his flanks.

DIAGNOSIS.—Throughout their course, and in particular in the latter and more violent stage, the symptoms of peritonitis commonly bear that resemblance to those of enteritis that it is difficult—often impossible—to distinguish the two diseases, unless we refer to their origin, and then the apparent mystery is likely to become solved. We must remember that peritonitis hardly ever originates in the acute form *spontaneously*; on the contrary, that, in that form, it is almost invariably to be traced back to mechanical injury of some sort; and this is often the only safe ground on which to build our opinion. Hurtrel d'Arboval assures us it is frequently induced by drinking cold water while the body is heated: we may therefore take this circumstance also into our account.

THE TERMINATIONS of acute peritonitis are in resolution, in gangrene, in the chronic form of the disease.

RESOLUTION, or the gradual abatement of the violence of the

disorder and progressive return to health, is the termination to which all our remedial efforts must be directed, although the one we are least likely to bring about, unless called in quite early—before the disease has had time to establish itself. When once it has gained ascendancy enough to rage with violence, we shall very rarely be able to prevent its terminating

IN GANGRENE; a change that will be made known by a somewhat sudden cessation of pain and irritation, and other alterations in the symptoms, such as have already been detailed in the account of enteritis*.

TREATMENT.—When once the disorder is recognized, no time should be lost in bleeding the patient until the pulse at the jaw totally fails; and in four or six hours afterwards, providing the pain and fever appear undiminished, the blood-letting should be repeated to an amount to make the same impression: for, unless this effect upon the circulatory system be produced, we do little comparative good. After two or three such evacuations as these, we may use the fleam with more moderation, and must be guided entirely by circumstances—such as direct us in blood-letting, in enteritis and pleurisy, and other acute inflammations. French veterinarians recommend the use of leeches and cupping-glasses to the belly, as means of topical blood-letting: since, however, we are in the habit of carrying the abstraction of blood much farther than the French, I apprehend that neither of these remedies would meet our views; independently of the one, viz. leeches, in addition to their inefficaciousness, being very expensive; and of the other being, I should imagine, exceedingly troublesome—nay, difficult, if not impossible—to apply in a case where there was acute abdominal pain distressing the animal all the while.

After the first blood-letting, give ten drachms of aloes in solution or decoction†. Flannels wrung out from water as hot as it is possible to bear the hand in, continually applied to the belly, will contribute much to soothe and abate pain. Steaming the belly by

* For which turn to page 249.

† The decoction should be kept in every pharmacy ready for use. The formula for preparing it will be found in vol. i, page 113.

suspending bags of hay dipped in boiling water underneath it, is practised by the French veterinarians. I prefer, myself, the application of a blister to any fomentation. Five or six hours after the exhibition of the drench we may commence giving aloetic clysters; raking also, should it appear necessary; in fact, doing all we can to promote the operation of the cathartic. Rowels and setons are of no use whatever. From what has been said, it will be seen, there is no important difference between the treatment of peritonitis and that of enteritis; so that, for any further information he may require, the reader may safely turn to the account of the latter.

CHRONIC PERITONITIS may prove the sequel or "termination," as it is called, of the acute form of the disease; though, as far as my experience has gone, I hold it to be much oftener an idiopathic disease—frequently a concomitant of inflammation of other serous membranes, in particular the pleura. The little pain and disturbance the chronic species creates in its incipient stage renders it difficult of detection; though occasionally, and especially when it comes to be more advanced and attended with certain consequences, what are called

"**SYMPTOMS OF ABDOMINAL IRRITATION**" will make their appearance, and give us reason to suspect its presence. These are—occasional pawing, but not with urgency; sometimes lying down upon one side at full length, and, while down, now and then raising the head towards the belly, and groaning; tenderness expressed when the abdomen is touched; flanks drawn in; respiration quickened; pulse small and frequent; bowels constipated, or else unusually relaxed; crouching under weight or pressure upon the back; an awkward gait of the hind quarters in walking.

TERMINATION.—The tendency of chronic peritoneal inflammation is to effusion of water into the cavity of the belly, a morbid state hardly more remediable than hydrothorax: it therefore behoves us to obtain the earliest information possible of the presence of such an inflammation, and when once we have attacked it, not to cease or even slacken our counter-active measures until we appear to have set our patient out of all danger of internal effusion.

TREATMENT.—Frequent small blood-lettings—about three quarts

every two, three, or four days, regulated by symptoms. Mild but continued doses of aloes and calomel, in combination with Venice turpentine or resin, and soft soap and nitre. Digitalis and sweet spirits of nitre may be alternated with the other diuretics. Blisters to the belly. Rowels in both chest and belly; and setons along the sides of the abdomen. Walking exercise, should the strength and state of the patient in other respects admit of it.

ASCITES.

ASCITES, or water in the belly, is what we have to apprehend when peritonitis, assuming the chronic form, continues long unchecked; though it is a malady which may proceed from other causes as well as inflammation. A dropsical diathesis, and disease of certain important organs—the liver, kidneys, and, in an especial manner, the lungs—are both influential in the production of ascites: both tending either to an augmentation of the natural secretion of the membrane, or else to the effusion of a fluid which, though serous, possesses some properties different from that exhaled in health.

THE SYMPTOMS denoting a collection of water in the belly are—dropsical effusions in other parts, in the sheath and underneath the belly in particular; also in the legs, if not at first, towards the conclusion; dropping and actual enlargement of the belly; fluctuation, and, on percussion, a dull obtuse sound different from a state of health; shrinking, or sense of tenderness whenever the belly is pressed, or weight is imposed upon the back; perhaps something awkward to be perceived in the gait of the hind legs in walking; at one time dull and dejected, at another, roused into action by an attack of colic or abdominal pain; quickened respiration; lying down at full length, and looking up and groaning; pulse small and frequent; bowels at one time costive, at another relaxed; appetite, though at first not to be complained of, failing in the latter stages.

CAUSES.—Ascites is very apt to be associated with hydrothorax. Now and then it will supervene upon one of those anasarcaous at-

tacks—swelled legs, &c., to which young horses are so prone during spring and fall. I have already shewn its connexion with peritonitis; a case in which the symptoms will partake more of the colic or enteritic character than in such as we may denominate cases of *pure dropsy*.

Ascites likewise proves consecutive of pleurisy. One serous texture after another becomes a prey to the spreading inflammatory diathesis; and while in one place it runs so high that lymph and pus are produced, in another, secondarily and more mildly affected, the inflammatory action expends itself in the effusion of water. In one case, the *cellular* membrane—the external serous textures—are especially affected; in another, the inflammation attacks most violently the *serous membranes*, or internal textures; while, in a third instance, *both* become the subjects of disease, and it is difficult to say which is attacked first, or suffers most.

Dropsy from Debility.—The same dropsies may be engendered apart from inflammation—in apparent connexion, indeed, with *debility*: a practical fact to which our attention has been particularly drawn by Mr. Brown, V.S., Melton Mowbray, who has given an excellent paper on the subject to *The Veterinarian* for 1832, from which I shall here cull some extracts:—

Spontaneous Anasarca—the name Mr. B. has given to this form of the disease—usually attacks, he says, one and two year-old colts grazing during the winter season in wet, poor, moory land, which accounts for its prevalence in Lincolnshire. With a view of preventing it, it is the custom there to take such colts up for the month of August, and feed them during the time exclusively on dry provender. The first symptoms of the disorder are—swellings of the legs, sheath, belly, and lips, and, finally, the eyelids; such tumefactions being soft and pitting, but not very sensitive. The breath and excretions manifest a peculiar odour. The animal turns sluggish and depressed; loathes his food; seldom lies down: his respiration becomes accelerated; his pulse feeble. To these primary symptoms succeed loss of flesh and prostration of strength; short and difficult respiration, with frequent and indistinct pulse; diarrhoea: which last, once established, carries the animal off in despite of all remedy.

The Treatment to be pursued is—to take the colt up, and give him a roomy box to run in; to scarify his swellings, and foment them either with simple water or a decoction of oak-bark—the sheath being supported all the while by suspension from the loins; or stimulate them with embrocations or blisters; and to exhibit internally vegetable tonics combined with diuretics, and allow a liberal diet. Should the bowels become constipated, small doses of aloes may be given: otherwise, both purging and blood-letting, Mr. B. assures us, are “contra-indicated.”

The Post-mortem Appearances have turned out to be—yellowness and lax-

ity of the muscular fibre; effusion into the cellular membrane; thickening of the pericardium and pleura, with effusion, almost to the amount to collapse the lungs and arrest the heart's action. Effusion into the omentum, mesentery, peritoneum. In one, and but one, subject, the kidneys were become disorganized.

DIAGNOSTIC.—But a few years ago veterinarians in England would have ridiculed the idea of naming even such a thing as a diagnostic for the “obscure” and hardly-known disorder we are here considering. Experience, however, has since taught us that we may safely trust to the external dropsy, the enlarged and fluctuating belly, the peculiar dull sounds elicited by percussion, together with other corroboratory signs and circumstances, as pretty sure tests of its presence.

THE PROGNOSTIC must be such as to create alarm: though instances of recovery are recorded, they are seemingly but incidental, and too rare to afford us any ground for calculating on a successful issue.

Mr. Cartwright relates a case he considered to be one of ascites—though evidently complicated with “farcy humours”—which was, after great perseverance in small blood-lettings, aperient and diuretic medicine, and counter-irritants, completely recovered. Scruple doses of cantharides were occasionally given with apparent advantage.

THE POST-MORTEM APPEARANCES consist in the presence of an aqueous fluid in the cavity of the belly, accompanied by congestion in the peritoneum, or, more likely, alterations in its structure. In general the effused fluid is of a bright yellow colour, perfectly pellucid, and altogether similar in its aspect to the serum of the blood; though at times it is almost as colourless as water: in fact, it is evidently of the same description as that found in pleurisy. I have seen the cellular tissue of the mesentery and mesocolon loaded with the same fluid. I have also met with a case in which the cellular tissue connecting the muscular to the vascular coat of the stomach was filled to that degree, that one tunic was not only completely but widely separated from the other. Now and then flocculi of coagulable lymph are found in various places adhering to the surfaces of the intestines, while loose portions are floating

about in the water, giving that a turbid whey-like appearance. The peritoneum is either not perceptibly altered in its aspect and texture, or exhibits a general and more or less intense reddening; or else is reddened in patches. In inveterate cases, losing its shining character, it turns opaque and white, and becomes more or less thickened in substance. Of the abdominal viscera, the kidneys seem the most subject to morbid alteration in these cases: I have occasionally found them pale, unusually tough in their texture, with purulent matter in their pelves. Mr. Brown (of Melton) met in one case with "purulent mucus" in the pelvis, with ulceration of its surface.

THE TREATMENT of ascites, so far as it involves the constitution, must be conducted either upon a plan of depletion or of support, or else upon a judicious combination of both modes of procedure. Unless we are able in our own mind to unravel the pathology of the case—to ascertain whether it be a primitive or secondary affection, a local or constitutional one, we are not likely to arrive at much success in practice. The majority of cases will be found to combine fever or inflammation in their nature, and consequently require depletives. Blood-lettings, small, but often repeated. Purges, mild, but continued, in combination with diuretic and sedative medicine: the following formula will be found to embrace these desiderata:—

Take of Barbadoes aloes	ʒiiss
Calomel	gr. xv
Powdered digitalis.....	ʒj
Powdered nitre	ʒij
Soft soap sufficient for a ball.	

To be given every morning fasting, until purgation be produced. To this ball may be added from five to ten grains of powdered cantharides, should it not produce a full secretion of urine.

THE EXTERNAL SWELLINGS are to be regarded rather in a favourable light than otherwise: any sudden or rapid disappearance of them would be enough to create alarm, for fear of its augmenting the internal dropsy; at the same time it may and often does happen that these outward tumefactions increase to that degree to occasion inconvenience from their volume. With a view

of diminishing them, and relieving their distention and weight, the best practice is to scarify their tensest and most dependent parts with a broad-shouldered bleeding or abscess lancet; and to encourage the serous issue that follows, as well as any hemorrhage that may be produced, by fomentation long and perseveringly persisted in. These scarifications may be repeated once or even twice a-day, should the tumefaction be such as to require the repetition.

WALKING EXERCISE in hand is advisable, providing the strength and condition of the patient be equal to it, and with the understanding that the state of the disorder itself do not forbid it.

TONICS.—There will arrive, in most cases, a period or stage of disease in which we shall find it inadvisable to carry depletion—blood-letting and purging—farther; nay, tonics will appear to be demanded, not merely to recruit the strength of our patient, but to enable his absorbent system to remove the remaining effused fluid. It is not easy in practice to determine this critical period when we ought to substitute one mode of treatment for another: every circumstance connected with the constitutional state of the animal, and the stage the disease is in, must be taken into account, and with that the progressive effects, beneficial or otherwise, we have already seen resulting from depletion; and from a careful consideration of all these circumstances put together, we must shape our future plan of procedure. Mr. Brown has shewn us cases of a description in which tonics are recommendable even from the very outset. Now, there are many medicines we call tonics; though, should they all prove so, it would seem, so different is their nature, that it is impossible they can all operate on the system in the same manner. We have vegetable tonics and mineral tonics: some practitioners preferring one kind, some the other; while some veterinary surgeons there are who in practice combine the two. All practitioners concur in the advantage of including some diuretic medicine in the formula. Either of the following balls may be administered daily; with this proviso—that the bowels, during the time, are kept from becoming constipated by clysters or occasional doses of aloes.

TONIC-DIURETIC BALLS.

Take of	Take of
Powdered cinchona, ʒss or Quinine, ʒi	Powdered blue vitriol, ʒj Or powdered green vitriol, ʒiiss
Powdered gentian, ʒij	Powdered gentian, ʒij
Powdered ginger, ʒj	Powdered resin, ʒiiss
Venice turpentine, sufficient for a ball.	Soft soap, sufficient for a ball.

Mr. Brown uses balsam of copaiba, substituting it for or mixing it in equal parts with the Venice turpentine. Mr. Cartwright prescribes cantharides with the same view, viz., to excite diuresis: they may be added in the proportion of five or ten grains of the powder to either of the above balls.

SECTION XIII.

DISEASES OF THE LIVER AND SPLEEN.

ACUTE HEPATITIS	BILIARY CALCULI
HEPATO-PERITONITIS	SPLENITIS
COMPLICATED HEPATITIS	HYPERTROPHY
CHRONIC HEPATITIS	OSSIFICATION
JAUNDICE	RUPTURE
RUPTURE	CARCINOMA
WORMS	MELANOSIS.
HYDATIDS	

PRELIMINARY OBSERVATIONS.

AWARE of the connexion between the mechanism and economy of these two glands, it is not unnatural to suppose that some sort of sympathy should be found to subsist between them under disease: indeed, the coincidence is acknowledged by Hurtrel d'Arboval, and likewise seems to have received the assent of Volpi, whose arrangement I have followed in the present Section. Few and infrequent, however, as these disorders are, and limited as our present knowledge is concerning them, this is a point we hardly dare insist upon.

THE LIVER, a part often diseased in men, is but seldom so in horses. Professor Coleman, in his Lectures, has adduced as one reason for this, the complication of the biliary apparatus in man, and its comparative simplicity in the horse; the latter having no gall-bladder. Hurtrel d'Arboval takes another view of the subject, and ascribes the difference to the little cellular tissue entering into the composition of the horse's liver. May we not also take into the account, the absence of causes in respect to horses which are known to produce bilious disorders in men? to wit, intem-

perance in living, passions of the mind, sedentary habits, &c. ? Hot climates are well known causes of these complaints in men ; and, from an account of Transactions at the Veterinary School established by M. Hamont at Abou-Zabel, in Egypt, they would appear to be likewise influential in their production among horses*. Added to their infrequency, diseases of the liver are, with one or two notable exceptions, so obscurely marked, as to be either exceeding difficult of detection during life, or else to pass totally unobserved until after death : frequently in the course of our post-mortem examinations do we meet with the liver in a diseased, nay, even disorganized condition, without any suspicions having been entertained during life of its being in a morbid state. Other instances occur of hepatic being mistaken for pulmonic disorder.

HEPATITIS.

WE use the word, hepatitis, to denote an inflammation either of the capsule of the liver, or of its internal substance or *parenchyma*. In fact, inflammation may attack the capsule, and thereto principally confine its action, or it may originate in and ravage the interior substance of the gland. Furthermore, in respect to the part in which it is seated, it may be either *partial* or *general* ; and, in respect to its character, *acute* or *chronic*.

ACUTE HEPATITIS.—In the present instance we may take the epithet *acute* to imply that form of hepatitis which from its activity or intensity is clearly recognizable in practice, in opposition to other forms which present no marks whatever, or but very vague and indistinct ones, of their existence. The pain the animal seems to feel, even in the acute disorder, is but of an indefinite sort of character ; while in the chronic it is but rarely we are able to detect any sign of pain whatever, or even indeed apparent inconvenience.

SYMPTOMS.—The horse is perceived to have become dull, inactive, moping, and probably to cough occasionally : he has a heavy

* An official Report of these Transactions is contained in *The Veterinarian* for 1839.

head, a drooping lustreless eye, loathes his food, and evidently feels unwell. He seems as if he were suffering some inward pain; but it is clearly not of an acute kind. He has not lain down during the past night; his dung-balls are small and dark-coloured; his urinary discharges scanty; and there is manifestly a strong fever rising in the system. The fever runs on, and, commonly on the second or third day after its onset, turns out to be what farriers call "the yellows," known by them to be so from the remarkable circumstance of the mouth and eyes assuming that colour. The inner surfaces of the lips and checks, the tongue, the conjunctive membrane, and, in some cases, the transparent cornea and iris as well, turn yellow, manifesting the diffusion of bile over the body; and the same is further demonstrated by the deep golden dye of the serum of the blood. I have also observed yellow matters floating about in the aqueous humour. The dung-balls are deeply imbued with bile, and in some cases enveloped in a viscid, bilious, mucous matter as well: their colour is that of a reddish brown, leaving, when rubbed upon white paper, much the same stain as opium would. If any urine be caught, it will be found to be thick, to exhibit the same bilious tinge, and to deposit, on standing, a copious lateritious sediment. The horse will probably lie down quietly, and yet not appear easy, but from time to time turn a dolorous look at his side, and soon after rise himself up again; and if the right side be pressed against, he will flinch or bite, or otherwise express tenderness there. Hurtrel d'Arboval, indeed, speaks of heat and tumefaction of the side. The pulse becomes quick, strong, and bounding. The breathing is disturbed in some cases; in others tranquil. From being simply dull and heavy, the animal turns quite stupid; at times vertiginous, so that he staggers in his walk, and is unsteady even in his stall. In this state, should no relief be afforded him, the patient is in danger of apoplexy on the one hand, and, on the other, of his liver bursting.

LAMENESS OF THE RIGHT LEG in hepatitis has been observed both by English and French veterinarians,—"*Ce qui est remarquable,*" says D'Arboval, "*il boite quelquefois du membre antérieur droit, ce qui semble indiquer que la douleur s'étend jusqu'à l'épaule, comme dans l'homme.*" The most interesting case I am acquainted

with of this description—one that bears a striking analogy to the pain referred to the right shoulder in human medicine—is the following :—

The horse belonged to the Artillery, at Woolwich, and was lame in the off fore leg, through which ultimately he became so disabled, that he with difficulty projected the limb even in walking. No cause whatever being discoverable, and the lameness continuing in defiance of all that had been done by way of remedy, it was deemed advisable to destroy the animal. The limb was dissected; but every part appeared healthy. His body was then opened, and, strange to say, a thorn of considerable length was found sticking in the substance of the liver.

THE CAUSES of hepatitis are not in all cases demonstrable. We may probably set forth plethora and excessive stimulation of system as the two most general ones: over-feeding, over-exertion, particularly during hot weather; even simple exposure to heat in a climate where the sun has more power than in our own, may, likely enough, produce the disease. It has been remarked that stall-fed oxen become the occasional subjects of hepatic disorder, which is strikingly manifested after death by a yellowness of the fat of the body: in this instance, excess of aliment, with the want of exercise, would appear to be the cause. In consonance with all this comes the observation of Mr. Brown, V.S., Melton Mowbray, “that hunters that are kept in the stable during the summer months are frequently attacked with hepatitis, which,” he adds, “may probably arise from their being too liberally fed, and a want of sufficient exercise.” To these causes may be added, injuries of the right side, or of the liver itself; gall-stones; worms in the biliary passages; inflammation of parts in the immediate vicinity of the liver, &c.

THE TERMINATION of hepatitis is generally speaking favourable; the disease being one that, though slowly, pretty surely gives way to bleeding and purging: two remedies which are of universal adoption among farriers and grooms for “yellows.” The greatest danger to be apprehended in cases where these evacuations are delayed, is bursting of the liver from over-distention; the gland being at the time gorged not with blood alone, but with bile also; though this danger will much depend on the condition of the liver, sound or unsound, at the time of the inflammatory attack. Even

the brain is far from being out of danger, so long as the liver continues in a state of congestion; adding one more cogent reason for the immediate employment of evacuants. Judging from analogy, and from all we are able to observe in practice, there is reason to believe that acute hepatitis now and then ends in the chronic form of disease.

PROGNOSTIC.—An evident amendment during the time the purgative is operating, or speedily afterwards, may be taken as an earnest of a favourable termination: should that and the fleam fail to give relief, there will be cause for alarm.

THE TREATMENT required is simple. In the first instance from four to six quarts of blood should be abstracted; and this evacuation immediately followed up by the exhibition of ten drachms of purging mass in a ball, or twelve drachms in solution; the operation of which may be accelerated by the occasional administration of a clyster. Calomel, and indeed every other preparation of mercury, being a stimulant to the liver, is to be scrupulously avoided. As soon as we perceive the physic to be setting, should there be occasion for it, we may take away another gallon of blood; and at the same time—after having had the hair shorn off—apply a blister to the right side, extending it from the borders of the ribs as far forwards as the place of girthing. The first dose of medicine once set, we may resume our operation on the bowels by giving daily the following ball, omitting it only at such times as purgation shall have recommenced:—

Take of Purging mass	3iiss
— Powder of digitalis.....	3i
— Powdered nitre	3iiiss
— Soft soap sufficient for a ball.	

Should the blister not have taken proper effect twelve hours after its application, it may be repeated. In case the disease appear to be merging into the chronic form, the insertion of two or three setons through the skin of the right side is a very commendable practice.

HEPATO-PERITONITIS—an appellation which will serve to denote inflammation of the peritoneal covering or capsule of the liver—is a disease of whose occasional existence post-mortem exa-

minations furnish us with sufficient evidence, though one whose presence we are not, perhaps at present, in a situation to demonstrate during life. I have in the course of my dissections found the membrane in question variously altered in texture—its shining transparency turned into opacity and dead whiteness; its substance thickened; its surface studded with tubercular eminences; strong adhesions contracted between it and the diaphragmatic expansion of the peritoneum. According to Hurtrel d'Arboval, hepato-peritonitis only occurs in conjunction with hepatitis or inflammation of the *substance* of the liver, existing either as cause or effect: I cannot, however, agree with him, having from dissection received sufficient proof to the contrary.

SYMPTOMS.—The expression of pain will be more decided in this than in any other form of hepatic disease. The respiration will be more disturbed; so much so as, without other collateral signs, to render it liable to be confounded with pneumony or pleurisy. There will probably be higher fever in the system: the pulse will evince greater quickness, and be rather contracted than full and bounding.

OUR DIAGNOSTIC, however, must, after all, be founded chiefly upon local symptoms, or such as have a more direct reference to the liver; such as tenderness or manifest heat of the right side, and any appearance of bile in the system, or of the redundancy or deficiency of it in the excretions—the dung and urine.

THE TREATMENT will be the same—allowing for any additional activity that may be required in the use of the fleam—as that prescribed for acute hepatitis.

COMPLICATED HEPATITIS.—Of this disease, of my own personal experience, I pretend to no knowledge whatever: I am wholly indebted for what I am about to offer on the subject to Hurtrel D'Arboval.

This writer informs us that among the complicated forms of hepatitis, the best known is that in which the appendices and tendinous portions of the diaphragm are involved with the liver in inflammation; though he acknowledges it a very embarrassing question to decide whether the *parapneumonia* be primitive or secondary. In either case the malady has received the name of *mal de feu ou d'Espagne*, probably from its prevalence in that country. During a campaign it will attack numbers of military horses at the same time,

and assume quite a formidable aspect. There will be high fever; sharp pain at the bottom of the chest, particularly during inspiration; orthopnoea; depression; despondency. The horse hangs his head low; heedlessly throws himself about; strikes the ground with his fore feet; shakes himself; dashes his head about; bites at every thing around him; often regards his flank; tears pieces even out of his own body; rears himself into the manger, and seizes with his teeth the bars of the rack, and thus maintains himself. In some cases the conjunctive membranes turn faintly yellow. This dreaded malady almost invariably ends in death.

The Treatment consists in prompt and copious blood-lettings; in the application of blisters to the temples as well as to the region of the liver; also of ice or cold lotions to the head; and in the administration of such medicines internally as are acknowledged antiphlogistics.

CHRONIC HEPATITIS.—Although the dissection of dead horses furnishes us with ample evidence of the occasional existence of inflammation of the liver in a chronic form, still it is a disorder whose presence during life is apt to be veiled in much obscurity, if not, indeed, passed over altogether unobserved.

SOFTENING of its substance is a change by no means uncommon, and one that we believe to be consequent on inflammation; and yet we seldom obtain any knowledge of the disease until after death. The liver is found paler than ordinary—clay-coloured, and evidently contains an inordinate quantity of bile; at the same time it is so soft (or “rotten,” as the farriers express it) in its texture that but slight force thrusts the finger through its substance.

INDURATION OR SCIRRHUS is another species of disorganization to which the liver is subject, and, insomuch as regards the firmness of substance of the gland, one of a nature directly the reverse of the former. The liver, maintaining its colour, feels firm, tough, leathery, alias *scirrhus*, as we technically term it; and is interiorly in an evident state of condensation and vascular obliteration. This morbid change I believe to consist in the formation and subsequent spreading and coalition of

TUBERCLES.—Next to the lungs, the liver appears to be the most frequent seat of these formations. When present, the surface of the gland feels uneven to the fingers: a circumstance explained the moment its substance is cut into, by the exposition of various globular masses of greyish or yellowish matter, which we recognize

as *tubercles* ; though we are, in a general way, incapable of detecting their existence during life, and almost as much in the dark in regard to their nature and origin.

The observant Mr. Abernethy—speaking of these formations—remarks, “There are certain organs which under diseased action seem to produce but one, or scarcely any thing else but one, kind of morbid structure. It is an infusion of something into the interstitial parts, in larger or smaller masses, and this we call *tubercles*. The newly-formed matter, however, may be so extensively deposited that solidity is given to the whole, in which case it constitutes *scirrhus*. To use the language of Mr. Hunter, however, tubercles are to be considered rather as a disease *in* than *of* a part ; for, notwithstanding their presence, the gland will secrete bile: indeed, livers may be greatly diseased, and yet make very good bile. I have seen numerous instances of it.”

SUPPURATION OR ABSCESS of the liver I believe to be very uncommon ; at least, it has proved so in my practice. The origin of it appears to be, as in the lungs, suppurated tubercles ; though abscess may and will be very likely to arise from mechanical injury.

ASCITES may prove a sequel of disease of the liver. A case happily illustrative of this connexion is detailed in *The Veterinarian* for 1832, by Mr. Hales :—

On the 3d February, 1832, Mr. Hales was called to attend a hunter, the property of R. M. Biddulph, Esq. M.P. He found the animal, a mare thirteen years old, much reduced in condition and very unwell ; the membranes of her mouth, nose, and eyes of a pale yellow colour ; her body constipated ; pulse 50 ; appetite all but lost ; had been bled so lately as three days back. Under the fullest conviction that the liver was diseased, Mr. H. ordered small doses of aloes and calomel, with sulphate of potash. But one ball had been given when purging came on ; which however ceased, notwithstanding that the medicine was continued. The yellowness of the membranes gradually disappeared ; while one day the mare was better, another day worse : thus continuing to fluctuate until the 29th March, the day she died. For some days previous to death Mr. H. suspected the presence of water, but was without any signs to determine his prognosis. On being opened, the belly was found to contain several gallons of a red serous fluid. The peritoneum was thickened, and exhibited a black hue ; as also did the external tunics of the colon and cæcum, which were even in parts “granulated.” The liver was very much enlarged. Its peritoneal covering could easily be stripped off ;

while its internal structure "was broken down and destroyed," having the appearance of "broken-up coagula, interspersed with streaks of pus;" indeed, "no vestige of its natural structure remained."

TREATMENT.—Aware how gradually and insidiously these chronic affections of the liver steal on; how little inconvenience—to say nothing about pain—they are apt to cause the animal; and consequently how remote and uncertain the chance is of our obtaining any knowledge of their existence; we cannot expect, at least in private practice, that they will often come under our notice; and when they happen so to do, there will be but too much reason to apprehend that they may have passed that limit beyond which they are out of the pale of remedy. However, early or late, it becomes our duty to endeavour to counteract what is but too evidently "consuming the vitals" of our patient. Should there be febrile symptoms present, and our patient yet strong enough to bear depletion, we shall do right in abstracting blood; not, however, to a large amount; for, remember always, *small and repeated blood-lettings* are, even from the very outset, *of more avail in chronic diseases* in general than large evacuations. Purgation, briskly excited and kept up, is more likely to prove beneficial during the inflammatory stage than any thing I know of; but on no account during inflammation is calomel to be administered: the liver is already in a state of over-excitement; and if we believe that mercury exerts any action upon the organ, surely its use in this condition of the liver must be completely counter-indicated. Where we suspect an enlarged or a tuberculous or scirrhus condition of the gland, we have some prospect of doing good by having recourse to the exhibition of iodine, both in the form of ball and of ointment. Blisters and setons may also be brought to our aid, the same as if the case were one of acute hepatitis.

JAUNDICE.

THE remarkable yellowness of the skin, eyes, and mouth in this disorder obtained for it among the farriers of old the name of *yellows*; by whom—owing apparently to their confounding with it

affections of the lungs—jaundice was imagined to be of very common occurrence. In truth, however, it is comparatively but a rare disease. And when present, is, in the generality of cases, if not in all, symptomatic of hepatitis, either of the acute or chronic character. Independently of the consideration of the general absence of other causes for jaundice, this is an opinion we are naturally led to adopt from fever being a concomitant of the disorder, as well as from the circumstance of its yielding to copious evacuations, more particularly to bleeding and purging.

THE SYMPTOMS, then, of jaundice will be those of hepatitis. Those especially characteristic are, yellowness of the eyes, nose, mouth, and skin wherever it can be perceived, accompanied with saffron-coloured urine and serum of the blood, and with dung either of the same bilious tinge, or else altogether devoid of bile—clay-coloured.

PATHOLOGY.—I repeat, I believe jaundice in horses commonly to result from hepatitis: I do not mean, however, in asserting this, to deny that it may have other origins. Authors tell us that it may originate in obstructions in the biliary duct, occasioned by gall-stones, stricture, &c.; though into this opinion they appear to be led rather in conformity with what happens in human practice than from observations on horses. In oxen and sheep, according to all account, such occurrences happen; but, then, they possess a gall-bladder and additional duct, the same as man. Changes of diet and derangements in the digestive function are also mentioned among the causes of jaundice: I cannot, however, as far as my own practice has gone, put much faith in them. Mr. Shipp has remarked, that green food, clover and vetches, dispose to jaundice.

THE TREATMENT of jaundice must be conducted upon the plan I have already laid down for the cure of hepatitis. Inflammation being the proximate cause—the morbid agent—that must be made to succumb. At the same time we must have in view the ejection from the system of the redundancy of bile. Blood-letting will assist in this, but purgation will accomplish it most effectually. For more particular directions how to proceed in the treatment, turn back to hepatitis, both acute and chronic.

RUPTURE OF THE LIVER.

HORSES advanced in life, and who from being well fed, and but little or but occasionally worked, grow fat and gross in their bodies, become the especial subjects of this lesion. In a very interesting communication on the matter from Mr. Siddall, V.S., Royal Horse Guards, he writes, "it has only occurred to me once to see a horse with this so young as seven years old." So far as I know, this is the youngest case on record.

PATHOLOGY.—The age and habits and condition of horses found disposed to this accident are such as conduce to, and would indeed indicate, some morbid condition of the liver. There are two states, and very different ones, in which the ruptured gland has been found: a state of congestion, gorged with blood; and a pale, clay-coloured, softened, disorganized, fragile condition of it. D'Arboval and other French writers make most mention of the former; most British veterinarians describe the latter. In either case the gland is in a state exceeding obnoxious to burst or rupture upon application of some exciting cause. And we can very well imagine how it has come into such a state when we come to consider the age and habits of life of the subject of it. Since the stall-fed ox is so prone to disease of the liver, is it not reasonable to suppose the stall-fed horse should be subject to some similar disorder? Chronic hepatitis is a disease so obscure and insidious in its course, that horses in general have it without any knowledge on our part of its existence: in fact, we know nothing about it until the subject of it comes to die, perhaps from ruptured liver, and we find the gland clay-coloured, softened, and so rotten in texture, that it will hardly bear handling without falling to pieces. Supposing, however, the liver to continue sound under these predisposing causes to disease, it is still very likely to become congested—filled to bursting with blood from plethora and consequent oppressed and languid circulation—and in this condition to be liable from the same causes to become ruptured. D'Arboval mentions the case of a horse who was attacked with symptoms of founder, and was treated for them; but who, on his being admitted into the College at Alfort, shewed

quick pulse, and hurried and irregular breathing, without manifesting any pain, and four hours after fell suddenly down, and died without a struggle. The liver had acquired the enormous volume of sixty-two pounds, was intensely black, as if it had been steeped in blood, and presented along the inferior border a considerable rent, from which had escaped about three gallons of blood.

THE RUPTURE in most cases, I should say, happens all at once; but the hæmorrhage from it would appear as if it became partly—nay, in some cases perhaps completely—stanced, and then relapsed: to these conjectural deductions—for they are nothing more—we are led from a consideration of the symptoms in the various cases we have witnessed and perused accounts of. In a case that occurred to Mr. Siddall, the horse had been ill, and subject to frequent faintings for *upwards of three weeks* before he died; which appeared afterwards to have been caused by small ruptures of the peritoneal covering of the liver in different places, of all which he rallied, not sinking until the grand rupture had happened.

A grey coach-horse, belonging to his Royal Highness Prince Albert, had been unwell the day before—heaving at the flanks, and off his feed—when Mr. Siddall was sent for to attend. His respiration was now short, and accompanied with sobbings, and particularly when moved, though comparatively tranquil while standing alone undisturbed, except now and then, when a sort of paroxysm came on. Extremities cold; pulse frequent and small, and easily compressed. Sclerotic coat and buccal membrane blanched; tongue covered with frothy saliva; breath stercoracious; fæces scanty and dry. Medicine and gruel were prescribed. The next morning the groom found he had eaten his mash, and thought he appeared more cheerful. Soon afterwards, however, while doing something up stairs, over the stable, the groom heard him fall, and in a very few minutes after, he breathed his last.

So, in the above case, the horse survived forty-eight hours after his attack.

THE IMMEDIATE CAUSE OF THE RUPTURE appears to be either excessive distention, or some effort of respiration or bodily exertion, or some injury. In a case which happened in my own Regiment, the troop-horse had been standing for thirty hours, unmoved, in his stall. He refused his food, for the first time, one Sunday at noon; at four o'clock p.m. he was perceived to rock about in his stall, as

though every moment he would fall ; the farrier-major was immediately sent for, and bled him, and while his blood was flowing, he fell and died. His belly contained twenty quarts of black viscid blood. His liver was rent across its concave or posterior part ; and, with the exception of the breach, was everywhere clay-coloured and highly lacerable. In this case, distention of the bowels at the time that some effort was made in the breathing appears to have occasioned the rupture of the fragile liver. The same may happen through bodily exertion. Mr. Brown, of Melton Mowbray, was sent for in a hurry to attend the Old Queen, a famous huntress. Two days before she had gone through a good run ; having four months previously experienced hepatitis. A few minutes after Mr. B.'s arrival she died. The liver was found clay-coloured and disorganized, and " its thin parts brittle."—A kick, or blow of any kind, may occasion it. M. Millot, V.S., Vitteaux, was sent for to a horse who had symptoms of colic, but who—from being pressed and tapped on one flank while the other was supported, giving out sounds of the presence of fluid—M. M. thought had peritonitis. In twelve hours he died. The belly contained two gallons of black blood, mostly coagulated. A rupture, with irregular and fringed borders, two inches long, ran across the left part of the anterior face of the liver. The horse, it came out afterwards, had been, the day before, several times kicked upon the chest by other horses.

THE SYMPTOMS will vary, and be more or less characteristic, according to the nature and extent of the lesion, the stage the case happens to be in, and other circumstances. The horse grows dejected and loses his appetite ; his respiration becomes short by fits—sobbing or sighing perhaps—and much worse should he be moved at all ; the membranes of the eyes, nose, and mouth become exsanguineous and pallid ; the extremities cold ; the pulse frequent, and small and weak, or else imperceptible ; countenance distressful ; tremors ; instable upon his legs, rocking from side to side in the stall, or staggering in his walk ; suddenly falls, and with hardly a struggle is found lifeless.

WHAT IS TO BE DONE in such a case ? Certainly not what farriers and grooms are in the practice of doing—bleed. No ; this must be regarded as a case of *passive* hemorrhage ; and as such

must be treated by sedative and styptic measures, and not by depletives. Exceeding cold water may be dashed against the right side, or ice may be applied upon it. A clyster of cold water may be administered. And in regard to internal remedies, the best, perhaps, will be found to be oil of turpentine, that being both styptic and stimulant. Sugar of lead also, so famed in human medicine, may be tried. And I should say it would be highly advisable, in many cases, to administer an opiate. The greatest quietude must be enjoined, and every thing withdrawn or avoided likely to break in upon it.

WORMS—HYDATIDS.

WE read of worms being found in the biliary passages: I have never discovered any myself. Hurtrel d'Arboval enumerates their presence among the causes of jaundice.

HYDATIDS I believe to be occasionally bred in the livers of horses. In those of sheep their presence is not so very uncommon: at one time the rot in those animals was ascribed to hydatids in the liver.

BILIARY CALCULI.

THE simplicity of the biliary apparatus of the horse affords him a kind of immunity from biliary collections. I know but of one instance in which any were found. That is published by M. Rigot, in "The Transactions of the Veterinary School at Alfort for 1833-4." Ninety of these calculi were taken from the hepatic tubes and duct of a horse by M. Rigot, and they were found to have occasioned considerable dilatation of those cavities, as well as thickening of their parietes. There existed no symptom during life to lead to any suspicion of the presence of the calculi. The same horse had a salivary calculus.

SPLENITIS.

As we progress in veterinary knowledge, we not only become better informed about recognised diseases, and more competent to treat them, but we obtain acquaintance with disorders of whose

existence we had been either in doubt or altogether ignorant. Splenitis is of this latter class. No veterinarian any longer entertains a doubt about the spleen being the occasional seat of inflammation; but we have yet to learn by what symptoms we are to diagnosticate this. Mr. Blaine acknowledges never having met with a case of splenitis in his own practice; but informs us he had recently "heard of a very well-authenticated one, in which the symptoms so exactly resembled hepatitis as to be mistaken by a very observant practitioner."—"The violence of the disease destroyed the horse on the fourth day." The spleen was found "highly inflamed, and nearly gangrenous." What I should take to be a similar case is narrated in *The Veterinarian* for 1836, by Mr. Cartwright. The symptoms were those of colic. Indeed, so similar were they, that Mr. C. acknowledges he "took it from the commencement to be obstruction of the bowels." The spleen—the only viscus diseased—proved "double its wonted size, gorged with blood, and black as jet. Its natural tough texture was quite broken down, and it was soft, and in a manner approaching to gangrene." There appears the singular coincidence between this and Mr. Blaine's case—that both patients died on the *fourth* day. I cannot say I ever encountered this active form of the disorder myself; but I have on several occasions found the spleen much enlarged, a change I should feel inclined to attribute to a sort of chronic splenitis.

We learn from Hurtrel d'Arboval that Ischenlin, veterinarian to the Grand Duke of Baden, has given the following description of the disease, under the denomination of *Gangrenous Inflammation of the Spleen*:—During the hot months—July, August, and September—rarely at other seasons, the disorder appears, and commonly as an epizootic. The horse, the subject of it, becomes heavy, lazy, disinclined to work, indifferent, listless; walks unsteadily; with head hanging down; ears lopping; eyes sparkling, inflamed, irritable, tearful; nasal membrane pallid and dry; expired air cold; mouth likewise cold and dry; tongue furred; also discoloured as well as the gums and palate. The respiration is at one time accelerated, at another slow; seldom a cough is heard, and that is dry and feeble; the pulse is quickened, oppressed, irregular; the belly is tucked up, tense, and hard; the dung dry and dark-coloured, or else soft and ill-digested; coat rough and pen-feathered. These precursory symptoms endure two or three days, or only as many hours, the animal eating and drinking well all the time; then comes on fever, a cold shivering fit succeeded by a hot fit, together with loss of appetite. In some one or other

part of the body soft swellings make their appearance, acquiring considerable volume in the course of a few hours, and emitting when opened a yellow serous fluid mingled with black blood. They do not suppurate, but run on to mortification. And now the animal's strength fails him; he with difficulty sustains himself standing; his body swells; and a tranquil death, rarely attended by hemorrhage, puts an end to his sufferings.

I must confess I feel myself but little informed by this relation of symptoms. It is, to my mind, an account which rather tends to shew that splenitis is a subject on which the French veterinarians are as much abroad as ourselves. The morbid change to which *post-mortem* examinations would lead us to believe the spleen to be most disposed, is hypertrophy or enlargement.

HYPERTROPHY OF THE SPLEEN.

In several instances I have found the organ hypertrophied; in some, very considerably augmented in volume and weight, and yet exhibiting no appearance of disorganization. In one horse I opened, the gland weighed fourteen pounds two ounces; making eleven pounds in addition to its ordinary weight. It has been found even larger than this.

Mr. Mogford, V.S., details five cases in *The Veterinarian* for 1832, in one of which its weight was found to be fifteen pounds, and in another supposed to be twenty pounds. Mr. M. also suggests a very natural and facile mode of detecting such enlargements during life:—Having first emptied the rectum by raking and injections of warm water, Mr. M. passes up his arm, previously oiled, and “with a creeping-like motion of the hand,” pushes on to the colon, where the hand being perfectly at liberty, can be turned to the left side, and detect any enlargement there may be—certainly to any great extent—of the spleen.

When from any unthrifty or ill-conditioned state of skin; from signs of indigestion or disordered bowels; from general unhealthiness and loss of flesh; from perceptible tenderness or feeling of enlargement in the left side, or any other unusual manifestation, we have reason to suppose the spleen to be the seat of the disease, I know of no means so well calculated to clear up our doubts on the point as those recommended by Mr. Mogford—manual examination *per rectum*.

THE TREATMENT must be altogether regulated by the view we may take of the case. Should there appear to be some inflammatory action going on, it will be right to bleed, but not to a large amount, and to repeat the evacuation. We may also purge moderately. At the same time a blister may be applied to the left hypochondriac region. Abstinence from labour will be required while we are doing this. And after this has been done, I know of no more likely remedy to work some beneficial change than mercury. I would give it, as Mr. Mogford does, in combination with antimony, in small doses, such as half a scruple of calomel to a drachm of antimony, twice a day for two or three weeks, then clear all off by a common purge.

OSSIFICATION OF THE SPLEEN.

Mr. Henderson, V.S., Park-lane, London, has in his possession a fine specimen of OSSIFICATION OF THE SPLEEN. An abscess, about the size of an apple, whose parietes were found to be osseous, had formed in the gland next the stomach, midway between its base and apex, from which was liberated after death a coffee-coloured purulent fluid. The horse from whom it was taken was a subject much wasted in condition, casually brought to a slaughter-house.

RUPTURE OF THE SPLEEN.

I know of but two recorded cases of this lesion :—

In the year 1812 I was called to a horse, then loose in straw-yard, about seven o'clock P.M., in consequence of his being "griped." I had him instantly removed into a stable, and administered two ounces of oil of turpentine*. As he appeared relieved, nothing more was done that evening. The following morning he experienced a relapse of the same symptoms in a more violent degree, of which he died about ten o'clock A.M. Shortly afterwards the body was opened. The first appearance that attracted notice was, that the guts were stained here and there with blood; and they were no sooner re-

* As the case turned out, this was probably the best medicine that could have been given. I leave it to my readers to determine what styptic virtues it evinced.

moved than from ten to twelve quarts of that fluid, partly congealed, were found effused into the belly. At first, I suspected this hemorrhage to have been caused by the bursting of some important bloodvessel; but further examination shewed the spleen to have been ruptured to the extent of about four inches, along its convex border, where it is opposed to the false ribs. While I was inspecting this wound in the spleen, which was now filled with a coagulum, I was amazed at the prodigious distention of the stomach with air—indeed, it occupied so much of the surrounding space that I felt inclined to believe that it might, by compression, have proved the cause of the rent in the spleen during some violent effort in respiration; for I could find no mark whatever of kick or any injury upon the side, either inwardly or outwardly.

Mr. Cartwright has reported a case, since this occurred, in *The Veterinarian* for 1838:—

May 26, 1838, Mr. Hutton, of the Fauls Green, sent out his brown gelding, four years old, half-bred, and in good condition, for cavalry duty. He was not, however, ridden in the ranks in consequence of his rider having a bad leg. Although while there nothing serious appeared amiss with him, still his rider thought he shuffled about more than usual. At two o'clock P.M. he returned home, and began eating and drinking. At three o'clock P.M. Mr. Cartwright was fetched to him. He had been uneasy, moving about and pawing. His pulse was 55; respiration natural. Mr. C. thought there was some irritation in the bowels, and gave opium. Though his pulse came with force to the touch, yet there was something that indicated difficulty in the blood being driven along. The conjunctiva was pale. He lies down at full length, but does not roll over. Looks at his side. At eight o'clock P.M. he was bled. On pressing the vein it felt flabby, and was not distended as usual. Blood with difficulty obtained, and very thin. Nine o'clock, worse; pulse at the jaw almost gone, and not distinct at the chest. He would stand tottering about for some time, and then fall violently down anywhere. Mr. C. began to fancy there was rupture of a bloodvessel. Nine to eleven o'clock P.M., very hopeless; falling down every twenty minutes, and once or twice has rolled over; seems insensible; pulse imperceptible; ears deadly cold; cold sweats; stertorous breathing; and when down gasping and struggling dreadfully. Died at eleven o'clock P.M. From eight to ten gallons of blood were found in the abdomen. A coagulum near the stomach led us to the upper surface of the spleen, in which was a rupture, towards the largest end, five inches in length. Two tumours were discovered upon other parts of the spleen, which looked like, and, indeed, on being cut open were found to consist of, masses of dark coagulated blood, and seemed as if a little more distention would have ruptured them also. There was a good deal of spotted dark bloody deposit in the neighbourhood of the spleen, on a portion of the diaphragm, between its coats, on its thoracic

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side. The lungs were inflated and blanched. The heart without blood and quite flaccid; and no blood in the vessels. The stomach was full, but not at all distended. Mr. C. adds, "I am sure the rupture was recent, and that the spleen did not exhibit any chronic or other disease."

CARCINOMA-MELANOSIS.

On the 18th November, 1833, Mr. Well's chestnut horse—slender, white-legged, flat-sided, delicate, and six years old, and had been much subject to cough that laid him up—was again brought to me for being "off his food, and having a cough." I ordered him some aperient febrifuge medicine, and had his throat sweated. In ten days he was returned, convalescent, into his own stable. There he was not treated as in his convalescent state he ought to have been, but was put to be broke into harness, and altogether a good deal abused; to which I attributed his re-admission into my "sick list" on the 7th December. On this occasion he was bled and blistered, and otherwise treated as a chronic pulmonic. He was bled a second time; but soon after such debility manifested itself, that it was evident depletion could be carried no further. His appetite now, however, became better, and he lay down and took his rest well. Still he looked unhealthy in his coat, and day by day lost flesh. His respiration has never been visibly disturbed, and his pulse is now but 50. Indeed, his only unfavourable symptom is, emaciation. And to such a height did this atrophy run, that towards the end of the month it was perceptible all hope of recovery was extinguished; and the consequence of this report was, an order from his master to have him shot, which was done on the 30th December. In his belly was found an enormous tumour, occupying on the left side all the interspace between the stomach and the pelvis, and appearing to absorb the entire substance of the spleen. It was globular in its general outline, measured four feet in circumference, and weighed sixty-seven pounds. Being divided with a sharp knife, the surfaces of the sections presented a marbly aspect, arising evidently from the varied composition of the interior. The superficial parts consisted of a soft, morbid sort of fatty substance, which, as we approached the centre, became mingled with fibro-cartilaginous inter-sections, of which latter substance the more central portions or body of the tumour appeared to be almost entirely composed, the radii which were sent out among the fatty and superficial parts having in the centre become consolidated into a kind of cartilaginous substance hard to be cut through. And yet it was reddish in its aspect, as though it had been vascular, and here and there presented cysts containing a yellow fluid and gelatinous matter, looking like serum and coagulable lymph, but which Mr. John Field—who was present at the examination—assured me were, according to Mr. Kyan's notions, specimens of *melanosis*. Further investigation clearly demonstrated that this immense tumour was to be regarded as deriving its origin from morbid growth

and conversion of the spleen ; for within the portion—about half of that viscus—still remaining, little globules or formations of fatty matter were to be found exactly similar in their character to the fatty portions of the tumour itself; and as a farther proof of this original structure, the spleen and tumour were so completely one body, that no line of demarcation, either outwardly in form or colour, or inwardly in composition, was to be made out between them.

On the 18th January, 1834, Mr. Anderson, V.S., Leicester, was requested to visit CONTRABAND, a dark brown stallion, rising eight years old, at four years old the best racer in the county, and afterwards hunted for two seasons, carrying fourteen stone, and sometimes three days successively. The patient was feverish, with the testicles drawn up, and one enlarged; he was dull; but there was no appearance of acute inflammation. The groom, a very intelligent man, was doubtful whether a cancerous tumour did not exist, as he had seen the same symptoms in another horse, who died, and was opened by Mr. Baker, and found to contain a tumour weighing eighty-four pounds; but there was no bloody urine. Mr. A. thought at first he had a case of scrotal hernia. On the 25th he was convalescent, and had got into tolerably good condition. On the 4th February he was attacked with hæmaturia. On the hand being passed over the loins, he crouched to the ground, and there was a stiffness about the loins, and he constantly appeared to be in the attitude of staling. Mr. A. now thought the case was nephritis. He was bled and clystered, and had fomentations to the loins, and mustard poultices and astringent medicine.—12th, Still very feverish, and great quantities of coagulated blood have been discharged.—13th, Hemorrhage continues; but the inflammation is subdued.—18th, Immense quantities of blood coming away. Ordered sugar of lead, catechu, and zinc internally.—22d, Has passed a great deal of blood since last visit; and at present it is dropping from him. Testes drawn up. Mr. A. had a consultation with Mr. Rowland, V.S., Oton, Notts. They differed in opinion as to the nature and treatment of the disease, though both agreed that it originated in the kidneys; “but neither of us anticipated the existence of such a voluminous tumour.”—On the 23d the horse died. A tumour was found attached to the spleen, left kidney, and super-renal gland. The right kidney and the viscera were all healthy. The tumour weighed one hundred and two pounds; measured sixty-eight inches in circumference—including the spleen, seventy-three. Mr. A. sent off the tumour the same day to Mr. Youatt for examination, remarking only, further, that “two things are certain—previous inflammation, and death by excessive hemorrhage.”

Mr. Youatt examined the substance, and found it to consist of “a conglomeration of *carcinomatous tumours*, rising one above the other, on the gastric surface of the spleen.” It evidently had originated in the spleen—small portions of what remained of that viscus were found changing their colour: there were all shades of change; and the altered parts were of various size and structure. In some places there was an appearance of brain. It was a carcinomatous

affection of the spleen, containing tumours of that kind termed *cephalomatous*. For a further and most accurately detailed account of this tumour, we must refer our readers to *The Veterinarian* for 1834.

Mr. Smith Huntley reports the following interesting autopsy in *The Veterinarian* for 1837 :—

In February last, Mr. Huntley was called to a mare belonging to Mr. Christie, surgeon; whom, on his arrival, he found dead. The bowels were highly inflamed. The spleen enlarged, weighing upwards of fifty pounds, and in a complete state of scirrhus. The pancreas was in a similar condition, and weighed more than thirty pounds. Also a small portion of the right lobe of the liver was so affected. The mare's prominent symptom was, falling away in flesh, although still feeding well, and up to within a short time of her death doing her ordinary work, " although not with any comfort."

SECTION XIV.

DISEASES OF THE URINARY ORGANS.

NEPHRITIS	{ ACUTE	DIABETES
	{ CHRONIC	URINARY CALCULUS
HYPERTROPHY OF THE KIDNEY		CYSTITIS
ABSCESS		CYSTORRHŒA
MELANOSIS		ISCHURY
DIPSOSIS		DYSURY
POLYURIA		STRANGURY
ALBUMINOUS URINE		TAPPING THE BLADDER.
HÆMATURIA		

THE chief parts of the urinary apparatus are the kidneys and the bladder: the ureters and urethra serving but as conduits to the fluid which by the former organs is elaborated, by the latter received and maintained until such time as becomes convenient for its ejection. The exemption of horses from venereal affections, and their less liability than men to generate calculous disorder, contracts the list of their diseases of these organs: indeed, were it not for injury—inwardly as well as outwardly inflicted—we should probably hear but little of such disorders. Over exertion, particularly under heavy burthens, is one grand cause of renal disease; medicine and food possessing diuretic properties constitute another; bearing which in mind, it will at all times become a leading desideratum in the treatment, to take care to remove or avoid the repetition of such influences. The kidney of the horse is a peculiarly susceptible organ: it is easily acted on; and many—indeed most—medicines that we are in the habit of using take some effect or other upon it. I believe this to be one reason why so very few medicines will purge horses; the majority of them being so readily carried out of the system through the kidneys. A fact strongly corroborative of this opinion—one to which my attention was drawn

many years ago by my late respected father—is that of a copious flow of urine of a dark colour being frequently observable in horses who have been but slightly affected by doses of physic they have taken, and who, notwithstanding the little or no purgative effect they have experienced, have shewn afterwards quite as much temporary weakness and loss in condition as if the physic had worked their bowels. I also set this down as a reason why mercury produces ptyalism with such comparative tardiness and uncertainty in horses. This susceptibility of the kidney, in veterinary medicine and dietetics must never be lost sight of: it is of vast importance to us in practice—that which renders our practice in many cases different from what surgeons would pursue under similar circumstances; we being able to effect so much more through the agency of these organs in the system of the horse than is to be accomplished in that of the human being. The veterinary surgeon, in fact, must often effect that through the medium of the kidneys which the surgeon does through the agency of the skin and bowels.

NEPHRITIS.

NEPHRITIS, or inflammation of the kidneys, in an acute form a dangerous disease, is fortunately of extremely infrequent occurrence in horses. When present, it is commonly assignable to some injury or abuse inflicted on the kidney. Girard informs us that it is an affection more common in ruminants than in the horse species, though attended with most danger in the latter. As an army practitioner, the cases that have fallen under my own immediate notice have been but few: this may arise from cavalry horses being, for the most part, exempt from the causes to which, I repeat I believe, the majority of cases of nephritis will be found to be referrible.

THESE CAUSES may be considered under two heads:—under those of *external injury*, and of *the use or abuse of food or medicine possessing diuretic properties*. The exertions the loins are put to, together with the violent and forcible extensions they are made to undergo in acts of hard galloping, in racing and hunting, and, in particular, in leaping, cannot fail to endanger the kidneys; and our only surprise is, that they are not much more frequently in-

jured than they prove to be after such efforts. The heavier the weight imposed upon the back under such circumstances, the greater must be their liability to receive hurt. Drawing very heavy loads must likewise subject the animal to similar injury. The practice—formerly so much in vogue in our cavalry—of halting horses on a sudden, and throwing them, unprepared, upon their haunches, is one that tends to put the loins to great trial. I believe, however, that inflammation of the kidneys is more likely to arise from acrid or irritating substances of a diuretic nature than from any of the afore-named causes. It used to be a common practice with grooms—and is, indeed, too much so at present—to be continually giving their horses diuretic medicines, without any regard either to the strength or nature of them, or, indeed, any thing else appertaining to them, save that they bear the appellation of “urine balls:” a practice absurd in itself; at the same time highly calculated to inflame or otherwise disorder the kidneys. The same may result from the use of foxy oats, malted barley, mow-burnt hay, &c.; though these are more likely to induce functional disorder. The presence of calculous matters in the kidneys would doubtlessly be apt to excite inflammation in them; but that is, at least in horses, but a remote contingency. Suppressed perspiration is generally ranked among the causes of nephritis: some add suppressed eruptions, evacuations, issues, &c. It would seem also as if inflammation might be propagated from the bladder, along the ureters, to them. After all, however, nephritis in the acute or painful form, is, as I before observed, but a rare disease.

THE SYMPTOMS of nephritis are—an awkward, stiff, straddling gait with the hind quarters; standing with the hind legs stretched apart, and with the back roached, or “stuck up;” turning about or round or backing in the stall with pain and difficulty; refusing to lie down, and, when down, shewing a disinclination to rise, owing to the pain and difficulty experienced in the act of getting up; flinching from pressure upon the loins; urinary discharge either altogether suppressed, or else reduced to small and frequent evacuations of brick-coloured and highly pungent, and perhaps bloody urine, or of such as is like whey in its appearance, arising from the presence of albumen or purulent matter. The horse is con-

tinually making efforts to stale, groaning and straining himself, while all he can squeeze out amounts but to a few drops : if the bladder be examined at this time, it will be found nearly or quite empty. These symptoms are accompanied by others, denoting the degree of irritation and fever present :—the pulse becomes quick and hard and contracted ; the horse paws, or stamps with his hind feet, and occasionally lies down, or he may heave at the flanks from pain ; and from the same cause he will perspire—the perspiration having, according to Girard, on occasions, an urinous odour ; mouth dry and hot ; great thirst ; constipated bowels.

CHRONIC NEPHRITIS.—I am inclined to think that nephritis in a mild or sub-acute form exists in many instances wherein, from the trifling perceptible alterations induced by it in the ordinary health of the animal, we are apt either altogether to overlook the disorder, or else to regard it as too unimportant to notice. Horses are often brought to us with complaints of difficulty and pain in staling ;—of the urine they pass being thick, or foul, or bloody ; and which horses probably may, on inquiry, be found to shew some stiffness about the loins when first brought from the stable, though by use the parts soon grow pliant again. And yet in a general way they exhibit every sign of health. With these facts we may connect the circumstance of occasionally discovering in horses who have died from other causes, purulent matter within the kidneys, and now and then disorganization of their substance, and without any thing having occurred during life to direct our attention to those organs.

THE TERMINATIONS of nephritis are *resolution, suppuration, condensation and scirrhus, softening, mortification*. I believe the termination most likely to ensue to be suppuration of the mucous surfaces of the organ—of its infundibula and pelvis, a case in which the matter passes off along with the urine : though the substance of the gland, as well as the pelvis, has been known to become itself the seat of

ABSCESS. — An interesting example of this is given by D'Arboval :—

A mare fell into a hole, out of which she was got with great difficulty. From that moment she experienced inconvenience in locomotion : the verte-

bral column appeared inflexible; the pulse tense and irregular; the urine scarce, thick, and sometimes mingled with streaks of blood. The horse lay down but little, not being able to raise himself up again without great pain. M. Chouard being called to him, perceived at the superior part of the right flank a considerable swelling, which had been there some time, and had continued to augment from day to day without any sign of inflammation. At the end of a month he opened the tumour, and let out a prodigious quantity of pus. The puncture cicatrized; but in six months' time a deep fistula had formed in it, which, every time the horse moved, ejected a stream the size of the finger of white grumous pus. Notwithstanding it was twice laid open, the fistula would not heal; and the horse sank. Pus was found effused in the abdomen. The right kidney was four times its natural magnitude. Its pelvis, greatly distended, contained about three pints of grumous pus, communicating outwards through an opening in the posterior border of the kidney, which led into the fistula that had formed between the peritoneum and psoas muscles. The left kidney was larger than common, and its pelvis was distended with nearly a quart of limpid urine. The bladder, shrunk and thickened in its coats, contained but very little urine, and that sedimentous.

OF SOFTENING, a very satisfactory case is related in *The Veterinarian* for 1828, by Mr. Cartwright:—

“Each kidney was found to be in a complete state of putrefaction, of a light blueish colour: its texture so totally destroyed that the finger would pass through any part of it as through so much mud. The vessels of the kidneys did not appear diseased as I drew them out of the diseased masses.”

Hurtrel D'Arboval regards mortification as a more frequent termination than suppuration; and gives the following as

THE SYMPTOMS INDICATIVE OF MORTIFIED KIDNEYS:—Urinary discharges brown or black, filamentous, and fœtid; pulse small, irregular, intermittent; recurrence of sweats, and these all at once ceasing, the patient falls, and in violent convulsions expires.

HYPERTROPHY.—An instance of this, to an enormous extent, and proving fatal, is related by D'Arboval.

M. Clipy was called to attend a horse for being off his feed, which up to that time had always enjoyed good health. He found his gait difficult, especially of the hind quarters, and that the slightest pressure upon his loins produced great pain, particularly when he was made to bend downwards, which

he with all his power resisted. Urinary secretion scanty and bloody. The next day, in raking the horse, the rectum was found hotter than natural, the bladder in a state of semi-plentitude, and thrust, as it were, into the pelvis; the kidneys of an enormous size; and at the least touch of them the patient expressed great pain, and struggled to rid himself of the man's arm by violent contractions of the abdominal muscles. In spite of the most active antiphlogistic treatment, death ensued in eight days. The kidneys were found enormously enlarged, weighing each from twenty-four to twenty-seven pounds, occupying all the posterior part of the abdomen, and in some measure blocking up the opening into the pelvis, their inferior surface being upon a level with the pubes. Their surrounding cellular tissue was very much infiltrated, and their internal substance generally reddened.

OF CONDENSATION, INDURATION, AND SCIRRHUS I have seen several specimens in wet preparations. The following cases from D'Arboval, in illustration of these changes, are worth our attention :—

A horse suspected to have strained his loins, was for three months under the treatment of an empiric. For the two first he continued standing; at length he lay down, never to rise again, and died in a complete state of marasmus. In opening the body M. Chouard discovered that the left kidney, of its ordinary volume, had become cartilaginous. Its pelvis contained a large glassful of limpid urine. The right had also begun to undergo the same change, and had become firmly adherent to the peritoneum. In the bladder were found several stones about the size of peas; and one within the left ureter. Here, therefore, existed urinary calculi; but in the case which follows nothing of the kind was discovered :—

A horse, eight years old, strained his loins in descending a steep declivity; but in spite of the inconvenience it occasioned him in going, continued his work for eight months afterwards, at which time M. Chouard first saw him. He had not lain down more than twice or thrice since the accident, and was now couched upon his hind parts like a dog. The urine, which until now had passed frequently and in small quantities, had become suppressed altogether. There was obstinate constipation, and the patient appeared to suffer violent pains in passing his dung. He was destroyed. The left kidney, in a state of induration, had become a carcinomatous mass, of the size of a man's head, and about eight livres in weight, in the centre of which was a nucleus of suppuration. An aneurism, as large as the aorta, existed in the renal artery of the same side.

MELANOSIS.—The following is extracted from Professor Andral's celebrated *Treatise on Pathological Anatomy* :—

Messrs. Trousseau and Leblanc found, in a horse's kidney, a fibrous cyst of the bulk of a fist, which contained eight ounces of black fluid, formed of the different elements of the blood, and particularly of the colouring matter. In fact, there is scarcely a tissue in the body in which melanosis has not been found in some form.

THE DIAGNOSTIC SIGNS of nephritic disorder are, the peculiarity of the animal's gait behind; his tenderness upon the loins; his indisposition to lie down, and the pain and difficulty he experiences in rising; his unavailing and painful efforts to stale; the frequency, and quantity, and quality of the urinary discharges. These will serve to distinguish it from gripes and other painful disorders of the bowels: but these are not sufficient of themselves to enable us to discriminate between this and affections of the bladder. In cystitis the same incontinence of urine will shew itself; but in this case the discharges, though small, will collectively amount to as much as they do in health, and moreover will consist of urine possessing its *natural* character. Inflammation of the *neck* of the bladder will produce suppression of the urinary discharge, or suffer but a little to pass, and may so far at first mislead us: we have but to examine the bladder, however, to set us right in our diagnosis; should that prove distended with healthy urine, we shall have evidence enough that the fault does not lie in the kidneys. With our hand in the rectum, we may reach as far as we can towards the kidneys, with a view of ascertaining if there be any unusual heat to be felt, or tenderness expressed by the animal.

TREATMENT.—Our business here is, to abate inflammatory action as well in the system as in the kidneys themselves, and, at the same time, to do all in our power to assuage the irritation in the glands, and thus allay the pain consequent on it. Nothing will operate more quickly and effectually in the fulfilment of these objects than blood-letting. Draw without delay through a large orifice as much blood from the jugular as the pulse will bear: six or eight quarts may commonly be abstracted with advantage. This should be succeeded by the administration of an ounce of aloes with a drachm of calomel. Should the animal not have been raked at the time the hand was introduced to ascertain the condition of the bladder, it will be proper to perform that operation now, and to

follow it up by the injection of a clyster of two or three gallons of tepid water rendered lubricative by the addition of soft soap. The patient should be wrapped up in the warmest clothing, and have his legs bandaged with flannel, it being of great importance to maintain a hot skin—nay, if we had it in our power, to produce a moist one. All this done, and our patient provided with a loose ventilated box, an ample bed, and a pailful of water, or gruel if he will drink it, he may for a time be left to himself. A few hours hence he may require a second venesection; not, perhaps, to so large an amount as the first, but still large enough to make evident impression. Girard talks of bleeding *nine* times, Hurtrel d'Arboval of repeating the same *ten* or *twelve* times, in the course of the first twenty-four hours. Evacuations of blood at such short intervals cannot but be small, and, in my opinion, insignificant, unimpressive: myself, I prefer the practice of giving an effectual blow to the disease at once: I have invariably found this better than tampering whenever *acute* inflammation was raging. Whether he require or not so early as this a second venesection, the clyster ought to be repeated at the interval of a few hours, and continued at like intervals until such time as we see signs of the purge coming into operation: an additional reason for these frequent injections of water, as hot as can be borne, being that they may act as a sort of internal fomentation. Stimulants to the loins are commonly recommended, and I believe with reason; but there needs no hurry about their application: they will take little or no effect—at least no beneficial effect—until such time as we have succeeded in lowering the inflammatory excitement. There is a notion abroad that blisters are apt to do harm here in consequence of cantharides being supposed to be a stimulant to the kidneys themselves; and such I believe they are, and therefore, perhaps, are prudently laid aside in nephritic disorders: at the same time I have known cantharides to be given to horses in considerable doses—in doses to excite inflammation of the bladder—and yet to make no morbid impression upon the kidneys. Some practitioners pour boiling water upon the loins; others prefer an embrocation made of mustard and boiling vinegar. For my own part, I have no great objection to the use of a blister, providing it be sponged off with wa-

ter as soon as it takes effect: I say this because with many persons it is a consideration that the skin should not be blemished by being denuded. The animal should be allowed water *ad libitum*: indeed, he ought to have a large bucketful constantly within his reach—either of gruel or water; the latter, probably, is best, simply because he will take more of it, it being the *quantity* of the diluent, and consequent dilution of the urinary secretion, we are rather concerned about than its quality. Mucilaginous infusions or decoctions of all sorts certainly must prove of service in mingling with the urinary fluid, and rendering it less obnoxious to the irritable passages; but one cannot get horses to drink these fluids voluntarily—one is obliged to dose them, and this forms my objection to their exhibition. The object may be met in another way—by giving gum arabic or starch, or mallow extract, or, what is probably better than all, gum tragacanth, made up into balls.

Should these measures prove of avail in staying the destructive course of the inflammation, the subsequent treatment of the case need consist but in keeping the bowels soluble, the skin supple, and the stomach in a condition to digest its food and create appetite: objects which the following ball, given daily, is probably well calculated to fulfill:—

Take of Purging mass..... 3i
 Tartarised antimony..... 3i
 Carbonate of soda ʒiij
 Mucilage sufficient for a ball.

Should purging result from its daily administration, it must be discontinued, or the purging mass be reduced to half a drachm in quantity. On the other hand, should the inflammation in the gland, in opposition to all our remedial efforts, pursue its course and end in mortification, death will speedily close the scene upon us.

POLYURIA.

THIS term is used in human medicine by Dr. Elliotson to denote a profuse or inordinate quantity of urine: that eminent physician, very properly in my opinion, questioning the correctness of a nosology which regards simple excess of urine as diabetes, seeing that in the disorder properly so called the secretion becomes altogether al-

tered in quality, containing sugar, and is not *necessarily* in greater abundance than usual, although that is a very common attendant. When considered under the head of diabetes, this disorder obtains the epithet of *insipidus*, in order to distinguish it from the true or sugary form of the disease, which is called *diabetes mellitus*. In horse medicine we appear to have still greater reason to consider these disorders as separate; since polyuria is by no means infrequent among horses at a certain period of life, and under certain circumstances; whereas diabetes mellitus is a complaint hardly known: and besides, there are other forms of altered urinary secretion which might with quite as much pathological and etymological propriety be ranked under the head of diabetes. I therefore repeat, it would be better if medical and veterinary practitioners would come to the understanding, that nothing but the presence of sugar in the urine constitutes *diabetes*.

SIMPLE AUGMENTATION of the urinary discharges, without any material change in the composition of the urine, is the effect of a multitude of causes, some of an alimentary, others of a medicinal, and others again of a nervous nature, and when but temporary, cannot be viewed in the light of disease. Every horseman knows how very often certain kinds of hay and corn cause horses to stale more than they ought to do, and that drinking a large quantity even of plain water will produce the same result. Medicines called "urine balls," or *diuretics*, are given for the especial purpose of increasing the urine. But nervousness will likewise do it—fright, or anxiety of any kind almost, will make a horse stale inordinately: how frequently do we see hunters at the covert side, when the hounds are about finding, staling or continually stretching themselves out to do so; and I have seen horses having wounds commence staling the moment the twitch was put on, from the remembrance that that was the prelude to some painful cutting or dressing they had undergone before.

OF IMMODERATE THIRST—*dipsosis avens*—some few remarkable instances among horses are on record. Perhaps the most remarkable of all is the case that occurred to my father*. One

* Given in the first volume of this work, p. 22.

very similar to it is related in *The Veterinarian* for 1837, by Mr. Charles, V.S., London. To what we are to attribute this unnatural thirst—whether to any disordered state of the kidney, or derangement in the functions of digestion—appears problematical; it would seem to be connected with *some* morbid state, for so long as it has, in the cases related of it, continued, the animal has fallen off in his appetite and spirits and condition, and has not regained them until his excessive desire for drink has been satisfied. And there appears no risk of harm resulting from giving the patient his full of drink—no chance of his *bursting*, or indeed over-sweating, or even purging—for the water is carried out of the system by the kidneys almost as fast as it is received by the stomach. Here, then, is a disease consisting—as far as we know—in *morbid thirst*; let us now consider that affection whose prominent or only symptom, is,

PROFUSE STALING: Such being only regarded in the light of disease when it amounts to much more in quantity than is natural, and continues for that length of time that the well-being of the animal is evidently affected by it.

THE CAUSES for this must in general be sought for either in the provender the horse is consuming, or the water he is drinking. Dark-coloured, highly fermented, or mow-burnt hay; kiln-dried oats, or such as have speared or become musty from lying long in heaps; barley that has malted, and water having some mineral impregnation, are each and all of them to be viewed in the light of injurious agents, notwithstanding they are consumed in many cases with impunity.

During the three years of occupation the British army continued in France after the battle of Waterloo, Mr. Castley, V.S. 12th Lancers, had occurred to him some well-marked cases of this description. They arose from the unwholesomeness of the oats served out to the cavalry, which were issued from stores where they had lain in such enormous heaps as in a short time not only to heat, but to become “literally half rotten.” This at one time caused diabetes (insipidus?) to a “frightful extent.” Mr. C. endeavoured to check it by giving chalk in water. For common use, Mr. C. generally found the following formula satisfactory:—Take of powdered galls, alum, and bole, of each ʒi, ginger ʒi, and mix them in a quart of beer; or give them, divided into two parts, in balls, morning and evening.

THE SYMPTOMS, in ordinary cases, attendant upon these immoderate fluxes of urine are—insatiable thirst, with, unless this be satisfied, a refusal to feed as usual; unhealthy appearance of the coat; dispiritedness; inability to bear fatigue; loss of flesh; debility.

MR. STEWART, OF GLASGOW, in a paper on this subject, in *The Veterinarian* for 1839, describes two kinds of this disorder: one with, the other without, fever and bronchitis; the symptoms in the latter case being that of fever and bronchitis superadded. He also avers that he has seen the disorder occur when no cause for it was discoverable in the food.

THE QUANTITY OF URINE voided in some of these cases is so great as to be quite incredible*. The stall is deluged with the flow. In an account of the disorder as it occurred at one time in France, M. Lassange informs us, “the horses attacked voided five or six pints of perfectly clear urine every hour.”

THE QUALITY OF THE URINE is that of an *urina potus*. It is thin and aqueous, and perfectly transparent. According to Lassange, 100 parts of it contain—of water, 98.0; of urea, of benzoate, and acetate of potash, of acetate of lime, of chloride of sodium, and of free acetic acid, 1.5; of mucus and sulphate of lime, 0.5; making it to differ from healthy urine, 1st, in containing a larger quantity of water (for healthy urine has but seven-eighths of water†); 2dly, in the presence of acetic acid, which is in part free; 3dly, in the absence of any earthy carbonate, which in healthy urine abounds. No saccharine matter was detected.

THE TREATMENT of these cases is in the majority rather dietetic than medical. Strict inquiry must be immediately set on foot into the nature and quality of the food the horse is eating, as well as into the kind of water he is drinking; one or both of which—unless any other cause can be shewn for the origin of his disorder—had better be immediately changed. Should the horse be at-

* Mr. Charles's case, and that of my father, furnish proofs.

† This proportion of water accords with Mr. Brande's analysis of horse's urine. He found carbonate of lime, sulphate of soda, muriate of soda, benzoate of soda, and phosphate of lime, amounting altogether to one-eighth of the fluid analysed.

tacked during the spring or summer season, a very desirable change would be from the stable to the grass-field; or, when this cannot conveniently be done, soiling may be practised with advantage. Should the water appear to be the cause, and there be no means, or very great difficulty of obtaining any other kind, we may put a piece of chalk into the pail with a view of neutralizing or rendering less harmful the noxious impregnation.

THE MEDICINES found most serviceable in this disorder are astringents and tonics. A ball I am fond of myself is composed of sesqui-carbonate of iron and prepared chalk, of each half an ounce, made up with syrup, and given once a day. Mr. Castley appears to have derived benefit from galls. Mr. Stewart speaks in laudatory terms of opium. He gives daily a ball consisting of three drachms of opium, and of catechu, gentian, and ginger, two drachms of each, made up with a little tar.

SHOULD ANY FEVER EXIST, such medicines, of course, become inadmissible. In their place moderate blood-letting and purging must be practised. In case the urinary disorder outlive the febrile one—which it will not often be found to do—recurrence may be had to the opiate and astringent medicines.

ALBUMINOUS URINE.

To this subject my attention was first drawn in December 1838. An officer's charger, six years old, thoroughbred, who, before he came into the possession of his present owner, had been much used, and had obtained a good character as a hunter, exhibited some rather strange symptoms, respecting which my first impression was that he might have sprained his loins under too heavy weight in the riding-school. With a view of shedding some additional light upon his case, I desired that some of his urine might be caught; and this circumstance it was that at once unravelled the nature of the disease of which he was the subject. The urine proved to be light-coloured, but very thick in its consistence; in fact, it was, when poured into a glass, very much like so much melted calf's-foot jelly. I lost no time in consulting some of our best works on

human medicine on the subject, and soon learned that the case must be one of "serous or albuminous urine," a conclusion in which I became afterwards confirmed by the application to the fluid of the usual tests. Since this I have noticed two other cases.

THE SYMPTOMS observed in one slight case were, a continual desire in the horse to stretch himself out in his stall, and in this position to continue, with his fore legs extended under the manger and his hind ones backward, unless disturbed, all day long; not for the purpose of staling, but apparently because that posture seemed an easy or a comfortable one to him. In another case, the horse stood in his stall "all of a heap," with his back roached and his hind legs advanced underneath his body. Led out, the animal in his gait evinces stiffness in the back and loins, which is most manifest in turning round. There is some fever attendant; but this, in a slight case, will but amount to some heat of mouth and acceleration of pulse, without materially affecting, perhaps, either the spirits or the appetite. In a severe attack, however, there will be rigors, and a great deal of irritation, manifested by accelerated respiration, by loud blowing or puffing at the nostrils, by anxious countenance, and small quick pulse; combined with extreme disinclination to move, and great pain and difficulty in progressing and turning the hind parts. The bowels are commonly confined.

THE STATE OF THE URINE, however, must constitute our diagnosis. The groom must seize the earliest opportunity to collect some. Should it prove albuminous, it will assume a deep or dead straw-colour, and be found of the consistence of a thick solution of gum. Submitted to the test of bichloride of mercury, it will yield a copious milky flocculent precipitate, resembling white of egg; and in some cases—not in all—the albumen contained in it will coagulate on exposure of the urine to heat: when this last test fails, I take it the failure is attributable to the large quantity of water with which the albumen is united. Its coagulation, however, may still be effected by adding a little acetic acid, and afterwards some prussiate of potass.

THE ADULT PERIOD OF LIFE seems the time at which we are to look for this disease. My patients were aged six, seven, and eight years.

RELAPSE took place in one instance. The first attack, but slight, happened in April 1839; the second, very severe, occurred in March 1840.

DURING COLD WEATHER the disease has appeared. I have had no case in summer.

PATHOLOGY.—DR. BLACKALL, many years ago, directed the attention of the medical world to the albuminous condition of the urine in dropsy, regarding it as an indication of inflammation and a guide to the practice of venesection. But with respect to the same alteration in the urine occurring as a sign of diseased kidneys, it would appear we are indebted to

DR. PROUT, who, in one of his Gulstonian Lectures*, thus expresses himself on the subject:—"Albuminous Urine, or that variety termed *chylous* urine, I believe was first distinctly described by myself in my little work on urinary diseases."—The leading properties in this urine are, "that in general it so nearly resembles chyle in all respects, as to be scarcely distinguishable from it; that it occasionally passes on the one hand into blood, and on the other into lithate of ammonia; that the chylous state is generally found to be more marked two or three hours after eating, while in the morning it is sometimes nearly absent; lastly, *that its specific gravity little exceeds and sometimes does not equal that of healthy urine*; so that, unless the quantity of urine be inordinate, which is sometimes the case, the drainage from the system does not much exceed that of health; a circumstance accounting in some degree for the little constitutional disturbance generally produced by this affection."

This last statement does not hold good in regard to the horse. Most of the urine I have seen, during the continuance of the disease, has greatly exceeded in specific gravity healthy urine.

Dr. Prout, from his cases, concludes that the disease occurs equally in males and females; before and after puberty; occasions more or less emaciation; may continue many years, more or less, without affecting the constitution; the appetite being generally good, sometimes inordinate; and there being evidently an inflamma-

* These lectures are re-published in *The Veterinarian* for 1831.

tory tendency in the system during its progress, which is benefitted by blood-letting. In the chronic stages, the Doctor has found the complaint yield, for a time, completely to opium, astringents, and mineral acids; whereas, in other instances, these and all other tried remedies have failed. Sometimes the complaint ceases spontaneously, and occurs again after a long interval (as it did in one of my horses); and when it has once recurred, it appears to be very liable to return, particularly after exposure to cold, or any cold producing fever. In general, the Doctor has observed that all stimulating remedies and powerful diuretics and tonics do harm.

Lastly, the Doctor asks, "what is the intimate nature of the disease?" and answers, that, "like that of all others, it is obscure." The Doctor thinks it cannot be doubted "that both the assimilating organs and the kidneys are involved in the affection. The chyle, from some derangement in the process of assimilation, is not raised to the blood-standard, and, consequently, being unfit for the future purposes of the economy, is, agreeably to a law of the economy, ejected through the kidneys: but these organs, instead of converting it into the lithate of ammonia, permit it to pass unchanged. That this is a sound view of the matter, cannot, I think, be doubted; for if the chyle was properly converted into blood, this fluid, and not chyle, ought to be thrown off by the kidneys. On the other hand, it may be stated as an argument in favour of the notion that the kidneys are affected, that chyle has often been found in the blood when the urine was entirely free from albuminous matters; shewing that, in the healthy state of these organs, even though chyle does get into the sanguiferous system, it is not necessarily ejected, or, if it is, that it undergoes the usual changes in passing through the kidneys. This affection of the kidneys, however, like that in diabetes, does not seem to amount to organic disease, at least to such as is cognizable by the senses."

DR. ELLIOTSON, in his *Lectures**, expresses himself as follows on the subject before us:—"With regard to the albuminous state the urine, we are indebted to

"DR. BRIGHT for the fact, that, in organic disease of the kidney,

* Edited by Dr. Rogers, and published in 1839.

the urine is generally in this albuminous state; that is to say, contains serum. And that ANDRAL, in his 'Chemical Reports,' had previously mentioned a case where he found the urine albuminous and the kidney in a granulated state. He simply mentioned the fact. He had no more facts, and he came to no general conclusion, nor would he have been justified in doing so. But Dr. Bright has collected a large number of cases, and he has found that, when the kidney is in a disorganized state, the urine is generally albuminous. He does not say (so far as I can understand his book), that when the urine is albuminous the kidney *must* be in a state of organic disease; for he says, that sometimes he has seen it only gorged with blood. But still, even here, the kidney was *affected*. Some have gone further than this, and, I think, without any reason whatever. They would have us believe that nobody can have albuminous urine without organic disease of the kidney. Now I really cannot subscribe to this assertion; and for this reason: I have seen patients who were perfectly well a day or two before, but who have got wet through; symptoms of inflammatory dropsy have come on; the urine has become albuminous; but on bleeding them the dropsy has presently been got the better of, and the urine has recovered its healthy appearance. Why these poor people should be supposed to have had diseased kidneys merely because they had albuminous urine for a week, I cannot imagine. It is a mere assumption, I think. I could not open them, to ascertain whether their kidneys were diseased; but as they are in perfect health now, and had been in perfect health just before, and the urine is no longer albuminous, I do not believe there is any more foundation for supposing the existence of organic disease, than there is for supposing that cancer of the stomach is present in every case of temporary dyspepsia, because, when people *die* of dyspepsia, we find more or less organic disease. It is the business of those who make these assertions to prove their correctness; to prove that these persons have organic disease of the kidney, and not our business to disprove it. Because, when a person *dies* making albuminous urine, you always find structural disease of the kidney, it does not follow that, when the urine temporarily presents the same phenomenon, and the person recovers, he has had any thing more than a func-

tional complaint. Because the affection of the kidneys may arrive at such a degree of intensity as to destroy life, and you then always find organic disease, it does not follow that the *temporary* formation of albumen should be any thing more than a functional disturbance of the kidneys. I should draw just the opposite conclusion; and should suppose that, if the symptoms were temporary, the disease must be functional. Dr. Mackintosh informed me that some medical students in Edinburgh had lately ascertained that, when they ate pie-crust, and it produced dyspepsia, their urine became albuminous. They made this experiment over and over again; and the circumstance is nothing more than I should expect*."

These medical quotations shew us how long and how much the present subject has engaged the attention of some of the most eminent physicians of our own day; at the same time, they appear to demonstrate to us, that albuminous urine may exist without organic disease of kidney—may be the result of simple functional disorder of the gland—may even proceed from indigestion—nay, from disease of liver. All these are facts, however, which we, as veterinarians, must receive *cum grano salis*. We must regard them only as starting-posts from which we may safely set off on our inquiry, and which may prove to be fast grounded or not on further investigation. We know how little the horse is the subject of dyspepsia; we know how less still his aliment is varied, or of that kind likely to render him so: we have, consequently, stronger grounds than surgeons for believing that this change in the urine is the effect of some altered state, functional or organic, of the kidneys. I would, therefore, still counsel the veterinarian to continue to regard the appearance as an important aid, on occasions, in directing us to a safe and sound diagnosis;—as, in fact, connected with other collateral evidence, amounting to a proof that the kidneys are the seat of the animal's complaint.

MY TREATMENT, where symptoms of inflammation have dis-

* "Dr. Graves, the eminent Professor of the Institute of Medicine in the School of Physic in Ireland, has done much to dissolve the supposed invariable connexion between albuminous urine and disease of the kidney. He shews that it often depends on disease of the *liver*." See his valuable papers in the *Dublin Journal of Medical and Chemical Science*.

tinctly shewn themselves, either in the form of constitutional irritation or locally, has, in the first instance, been antiphlogistic. I have both bled and purged moderately, and applied upon the loins, in cases of much tenderness and stiffness there, mustard plasters, taking care to sponge them off with warm water before they have taken so much effect as to endanger the separation of the hair. So long as any febrile action continues to be manifested, the depletive plan, with attention to diet and abstinence from exercise, will be found most beneficial. Afterwards, the best moderator or corrector of the augmented or morbid secretion will be found to be *opium*. I have tried the stimulating diuretics, cantharides and tincture of muriated iron; but I find they do harm. One circumstance should be mentioned here, and that is, the continuance, from habit, of the stretching out of the legs in the stall after the complaint is removed, which, were it not for the return of healthy urine, together with the perfect restoration of the horse's action, would induce us to believe the disease remained.

Mr. Clayworth, V.S., Spilsby, transmitted to *The Veterinarian* for 1836 a case for an opinion, connected, I now believe, with the subject we are considering. It is this:—

In October a bay blood mare, then running in the mail, began to fall off in condition, in consequence of which she was turned into a loose box, where she rapidly regained flesh and spirits. A fortnight afterwards she was taken to exercise previously to being put to her former work. She appeared in perfect health, and very playful. She had proceeded with her rider about half a mile, when she suddenly stopped, began sweating and trembling without any apparent cause, and was with difficulty led home. Mr. Clayworth was sent for—found her sweating and trembling, and scarcely able to turn in the stall; the muscles of her back and loins in a state of spasm; tail quite stiff; kept looking at her flanks, and appeared in violent pain; dropped her hind legs in going forwards; but her loins did not appear tender when pressed upon. (In the rigid spasmed state in which they were, it is not likely they would.) About a pint of fluid was drawn from her bladder with the catheter, *of the colour and consistence of linseed oil*; after that, the same quantity, thicker and of the colour of porter; and a third portion of the colour of whey. These urines passed in succession, the catheter remaining all the while in the bladder.

That the urine resembling linseed oil was albuminous, there seems little doubt; that the portion resembling porter was mingled with blood, subse-

quently and slowly trickling from the kidney, appears probable; but why this should *suddenly* change and become like whey, I must confess I do not pretend to offer an explanation.

HÆMATURIA.

HÆMATURIA, or bloody urine, is a complaint every now and then made to us. When such a case does present itself, our grand aims must be, first, to find out whence it proceeds; secondly, to discover the cause for it. Blood may either come away alone and shew itself in its pure form by coagulation, or it may be discharged mixed with the urine, and then either only in part or not at all congeal. It may be difficult or impossible to say where it is coming from; whether from the kidneys or the bladder, or any of the passages. Examination both *per rectum* and externally upon the loins and about the penis may not go far to clear up this point; we must for the rest be guided by the symptoms, and by what account we can collect of the causes or history of the malady. It may proceed from inflammation, or from some disorganization of the kidneys or bladder, or from calculus: it is more likely to prove to be the result of some sprain or blow, or other injury of the organs.

THE TREATMENT must be entirely under the control of circumstances. Staling of blood may be—indeed generally ought to be regarded as—a dangerous omen. Should injury have produced it, we must keep our patient as quiet and as free from all sources of disturbance and irritation as possible, and medically treat the case as it shall seem to require. Should febrile or inflammatory symptoms arise, they must be subdued or moderated; and if present in the kidney, counter-irritation upon the loins may be employed. When no inflammation is present, and none apprehended, but the case assumes what is called the passive form of hæmorrhage, we may try the effect of internal styptic and sedative medicines, and the best appear to be those used in human medicine under similar circumstances—oil of turpentine and opium.

DIABETES.

THE term is here restricted in its meaning to denote that kind or form of disease in which *sugar* is found to be present in the urine, at the same time that the urine is—for it generally is—existing in much greater quantity than in health. I have some recollections of having witnessed a case of diabetes while a pupil at the Veterinary College, and of sugar being detected in the urine; but having made no notes at the time, I am now left in doubt about it. No English author, nor French one whom I know, gives any account of the disease that can be relied upon as a test of its having come actually under observation in practice. Some well-authenticated case of it—should such occur—would really prove a *rara avis* in hippo-pathology.

IN MAN, some startling and very curious observations have been recorded concerning it. One very remarkable symptom—and one which Dr. Elliotson says he never found to be absent—is the loss of sexual power and desire. Another is, that the quantity of urine voided has been known to amount to double that of the fluid drunk: indeed, some cases are on record in which every day forty pints—in some days fifty—were discharged. A third is, the urine has a sweet taste, and by evaporation yields about an eighth of thick residue, from which sugar is extractible to the amount of about two-thirds of the weight of the residue. And in consequence of this saccharine impregnation the urine has been found, by the addition of yeast, to be susceptible both of the vinous and acetous fermentations.

URINARY CALCULI.

THE rarity of their occurrence among horses is well demonstrated by the meagre state of our literature in regard to them. I shall, however, from the scattered cases of them on record, and from the accounts furnished by our continental brethren, endeavour to frame such a connected history as will enable my reader to recog-

nise and properly treat such a case, should one happen to cross his path in practice.

KINDS.—There are four situations in which calculi may be formed, or rather in which they have been discovered, viz. the kidney, the ureters, the bladder, and the urethra; and this has given rise to a distribution of them into *renal*, *uretal*, *vesical*, and *urethral calculi*: a classification having no reference whatever to their compositions.

RENAL CALCULI are commonly lodged within the pelvis of the kidney; though both in horses and men the *infundibula* have been found filled with them. Several of our veterinary museums contain specimens of renal calculi. A very fine specimen is in the possession of Mr. Ainslie, weighing twenty ounces, and occupying the entire pelvis of the kidney: unfortunately no history is attached to it, Mr. Youatt having perchance purchased it from a knacker. One larger still, weighing twenty-five ounces, was sent to the Veterinary Association by Mr. Bowles, V.S., Cambridge.

VARIETIES.—These calculi, according to D'Arboval, exhibit two principal varieties. One set are hard and compact; have a mingled yellow, green, and dirty white hue; with a form, not invariably but commonly, identical with that of the pelvis; are composed of regular layers; and, when sawn through, discover a central nucleus. The other set are areolated and tuberculated, rough and grained upon their surfaces, and not so hard, nor so compact or weighty, as the former, and have an agglomerated composition.

SYMPTOMS.—We appear to be without any that can be depended upon. In the early formation of the stone, and for the most part during its increase, it would appear that little or no inconvenience—certainly no expressed suffering—is occasioned by it: when it becomes weighty, however, and fills up the pelvic cavity, it must create considerable impediment to the flow of urine, as well as prove a source of more or less annoyance and irritation; though this probably is in some degree lessened by the hypertrophy of the cavity containing it keeping pace with the growth of the stone; and this is accompanied by hypertrophy of the infundibula as well, and by general augmentation of the gland itself. These changes are attended by inflammation and suppuration. Purulent matter

pervades and in time fills all the canals and cavities; and sooner or later the work of disorganization commences, to end only with the destruction of life. Periodical colics, with expressions of extreme suffering, and these coming on after exercise or exertion of any kind, and again ceasing as suddenly as they appeared, leaving behind them sedimentous and gravelly urine, are what D'Arboval has offered as the symptoms denoting this state of kidney. The state of the urine might certainly lead to a suspicion of stone, and the absence of any in the bladder or urethra might induce us to imagine the presence of one in the kidney.

OUR TREATMENT must be directed to the mitigation of irritation and consequent febrile disturbance. Blood-letting and purging; fomentations and mustard plasters to the loins; clysters; and the subsequent exhibition of acids—the acetous is one of the best—with a view of dissolving or rendering unirritating the calculous matters. Purgatives during the intervals of ease are also recommended on the ground of the commotion in the bowels produced by their action being likely to cause a descent of the calculus.

URETAL CALCULI are stones which have passed from the pelvis of the kidney into the ureter, and there, on account of their size, have remained fixed. They are of still rarer occurrence than the former. Chabert asserts that these may be felt with the hand introduced into the rectum; and that we have nothing more to do than to cut through the gut and ureter to extract, or, at all events, to dislodge them. Supposing both ureters to be plugged in this manner, of course there would be a complete suppression of urine. We might lengthen this account with further suppositions without affording much useful information; we had better, perhaps, acknowledge the case to be one of that exceeding rarity that, practically, we know but little about it.

OF VESICAL CALCULI, we find many cases standing on record both in our own veterinary annals and those of the Continent; and we are farther aided in our investigations by an excellent little pamphlet on the subject penned by the late distinguished professor of the French school, M. Girard. Some of the stones found in the bladder were no doubt originally renal calculi—formed within the kidneys; others there are, however, which we believe to be

produced and to receive their augmentation entirely within the bladder. The late Professor Coleman was of opinion that most calculi had their first formation within the kidney; and that in man, owing to his erect attitude, they readily descended into the bladder; but that it was quite otherwise in the horse, owing to his horizontal position; and this circumstance, he added, rendered cases of renal calculi comparatively frequent in horses. D'Arboval entertains a different opinion—"quelques unes descendent des uretères; mais c'est le plus petit nombre."

OF KINDS OR VARIETIES of vesical calculi, according to Girard, there are four:—The first, or *soft kind*, comprising the earthy inspissations, are soft like paste, but grow firm towards the centre. *The second kind* are yellowish or whitish calculi, with rugged, grained, or simply fretted surfaces, composed of an irregular mass of more or less coherent saline material. Some present areolated interiors, and exhibit different degrees of hardness in their composition. *The third kind* are formed of concentric plates, and are void of any central nuclei; they are commonly grey, fretted upon their surfaces, and harder than the foregoing sorts. In some of these the saline materials are found much less compact in the centre than towards the circumference. The fourth kind is *the calculus with nucleus*; of which there occur two varieties: one composed of concentric plates, as hard almost as flint, with a wall-like kind of surface; the other less compact, with a granulated exterior and a diversified areolated interior.

CHEMICAL COMPOSITION.—Urinary calculi taken from horses have been found by Fourcroy and Vauquelin to be as remarkable for the uniformity of their composition as those obtained from the human body have proved for their strange diversity and variety in this respect. Classifying human urinary calculi according to their different constituents, no less than eleven kinds are described as being at times met with; whereas in horses, taking the same mode of classification, no more than one kind can be said to be produced. Horses' calculi have proved uniformly to consist of *carbonate of lime*, and a very small proportion—one-hundredth part—of *carbonate of magnesia*, mixed up and cemented together by an animal matter found to be *mucus*, mingled in some cases with *albumen*.

The carbonate of lime is soluble with effervescence in the weakest acids; and this is an important fact to be acquainted with, because it leads to the suggestion of the medicines best adapted to—if any will—work some solution or diminution of them. As a rare exception to this unvarying composition, M. Lambert mentions an instance where a calculus so large was discovered, that it completely filled the bladder, which was found to contain a pretty considerable proportion of oxide of manganese.

THE SYMPTOMS in the early stages of the formation of calculus are, in general, either of a nature too trivial to attract notice, or they are of that indefinite character that we are unable to draw from them any practical or safe deductions; and either of these states may continue for an unlimited length of time—years even.

THESE INDEFINITE OR SUSPICIOUS SYMPTOMS, according to D'Arboval, are—"Less freedom in the movements of the hind quarters; lying down less, or reposing with the fore parts raised from time to time, seated upon the croup; frequent motions of the tail; the state of the urine—its growing by degrees thicker and whiter, and depositing, on standing, a sediment of the same nature as the composition of the soft or first kind of calculus; frequent desire to stale, and difficulty and pain in accomplishing it. In some cases, the walk will be tardy and straddling; the loins roached and stiff; the urine acrid and irritating; and the sheath or perineum tumid. At Alfort College it has been remarked that the penis sometimes becomes paralysed, and hangs out of its sheath."

MORE CHARACTERISTIC SYMPTOMS "are likely to arise at the time that the urinary concretion begins to assume the solidity and hardness of a true calculus, in consequence of the irritation produced by it upon the membrane of the bladder; though in general"—according to the same author from whom I am now transcribing—"the pains are not great except at the time that the calculus gets into the neck of the bladder, obstructing the passage, either partially or completely, and occasioning more or less difficulty in staling, or altogether preventing the act. The irritation set up causes frequent desire to stale, and to satisfy this the horse is continually making efforts, violent in proportion to his feelings: he stretches himself out and draws his yard, but often in vain, or with ability

only to dribble a little, and that with extreme pain. What he does pass is perhaps bloody, perhaps gravelly. The urinary irritation may induce colicky pains; in which case he will try to strike his sheath with his hind feet, and will look at his flank, grind his teeth, and shake his head from pain: in fact, during suffering, he may manifest all the worst symptoms of acute enteritic disorder. In their agony, mares have been known to expel their calculi, and in this manner effect their own cure. A horse has stopped himself all at once in his gallop to make water, and, being unable to accomplish the act, has refused to set off again. The animal can stale only at such times as, through relaxation of the bladder, the stone has fallen into its fundus. Towards the termination of this painful disorder, a horse has been known to experience seven or eight paroxysms of pain daily, and at last sink through extreme suffering. On the other hand, cases occur wherein calculus is breeding fatal mischief for years, and the horse feeding and working and looking in health all the while, even up to the day of his death."

EXAMINATION PER RECTUM—a mode of inquiry known even to Vegetius—is the veterinarian's grand confirming test of the presence of calculus: it may be said to constitute his *diagnosis*, for it will assuredly resolve all his doubts and apprehensions, and, moreover, can be easily and readily practised without the risk of any injury to the patient. The most favourable moment for examination is immediately after the voiding of the urine; it being much easier to detect the stone in an empty than in a full bladder. Should the bladder be distended at the time, we may by pressing upon it endeavour to force some urine out; and if none flow, it will probably be owing to the lodgment of the calculus within the neck, in which situation, by directing our hand more backward and downward, we may be able to feel the solid body, and possibly succeed in dislodging it, and pushing it backward into the fundus, and so occasioning a flux of urine. Should the stone have got so firmly impacted that we cannot move it, we must have recourse to a sound. In case we detect no calculus in our examination, and yet not feel satisfied in our mind that none exists, we must cast the horse, and examine the bladder afresh while he is turned upon his back. Should no stone be felt in this position neither, I should

conclude there was none. I should not deem it worth while to *cut* into the urethra to sound the horse*, although I might pass a sound in the case of a *mare*; added to which, in the latter case, we have in our power the manual examination *per vaginam*, during which we may pass our finger into the meatus urinarius, and possibly actually feel the stone itself.

THE CONSEQUENCES OF CALCULUS remaining in the bladder are, inflammation producing cystorrhœa, thickening, induration, scirrhus, ulceration of the lining membrane, extending through the outer tunics, and ending in rupture of the bladder and extravasation of the urine into the pelvic and abdominal cavities; the burst commonly happening at the fundus. D'Arboval speaks of meeting with calculi encysted within the bladder.

TREATMENT.—The existence of calculus being no longer an affair of doubt, the next question which arises is—how is it to be got rid of? We may take for granted that the basis of its composition is carbonate of lime; and upon this we know even weak acids make manifest impression. But acids, if given by the mouth, are found to undergo such change before they arrive in the bladder, that they no longer possess the power of acting upon the stone; and when injected at once into the bladder, they have proved irritating and otherwise hurtful in a high degree. Dupuy injected vinegar and water for a long while, but was at length compelled to desist in consequence of both the bladder and hind quarters being seized with paralysis. And of all lithontriptics, this, says D'Arboval, is in most repute. It has been ascertained at Alfort that it is capable of effecting the dissolution of calculi out of the body, the harder the stones the more acid being required; some demanding equal parts, with an elevation of the temperature of the mixture to 90 degrees of Fahr. If ever success should attend this mode of treatment, it will probably be, as D'Arboval justly adds, in the case of small calculi. But, even under such favourable circumstances, one could not recommend a proceeding so uncertain in its results, so liable to do harm,

* With Mr. Taylor's jointed sound, this operation may, possibly, be satisfactorily effected without cutting.

† See Professor Renault's operation for stone in a mare, in *The Veterinarian* for 1835.

and so tedious and tiresome in its effects, when we have remedies at hand which are now brought, in human surgery at least, to such a degree of perfection that they are practised not only with certainty of cure, but with comparative safety. At the present day three operations are in vogue for stone: two have its extraction as their object; the other the comminution of it.

DILATATION—without cutting—of the natural passages through which the urine is voided, may be said to be the simplest of these operations. It is practicable both in the male and female; but from its nature and effects is more especially suitable to the latter, in consequence of her urethra being short and nearly straight, and readily operated on. D'Arboval tells us that Henier, of Prague, has performed it upon a mare with success. And since, in our own country, Mr. Pope, of Aberdeenshire, has put its practicability and success to the test. In the case of one or more small calculi, this simple mode of procedure certainly ought to be preferred; and in the case of large ones, they may admit, first, of being broken to pieces. The best instrument for comminution appears to be the forceps constructed by Mr. Weiss of the Strand; only they would require to be made larger and stronger than those used in human surgery. Some preparation of the patient and of the parts, by way of relaxation, would seem to be required to facilitate the dilatation; although, from the accounts given of it by surgeons, it appears to be an operation which may either be effected in some minutes or may occupy some hours. In some instances, in order to expedite our proceedings, and enable us to dilate the passage with more effect, it may be requisite to slit up the urethra to some small extent: this became necessary in Mr. Pope's case. The safest instrument for this purpose is the *bistouri caché*.

LITHOTRITY—the crushing and comminution of the calculus—is an operation that has been and still continues to be practised among surgeons, some of whom, with the assistance of ingenious instrument-makers, imagine that it will one day or other save the pain of cutting for the stone: Mr. Liston, however, says—and this is authority we must all bow to—"I am not so sanguine as to suppose that the breaking up of the stone in the bladder will ever entirely

supersede lithotomy*." Many lithotritic instruments have been contrived and recommended of late years; the favourite one of the present day appears to be that called the *screw lithotrite*, also an invention of Mr. Weiss. In human practice this operation is recommended only for the adult whose urethra, prostate, and bladder are healthy, and in whom the calculus is below the magnitude of a chestnut: considerations which the veterinarian will find it his interest to keep in view. In a case of simple dilatation, should difficulty be experienced in drawing the calculus through the widened passage, it would be, perhaps, advisable to have recourse to the screw lithotrite.

LITHOTOMY—rather *cystotomy*, inasmuch as its meaning is, cutting into the *bladder* to extract the stone—is an operation of very old date in the annals of veterinary practice; one of serious and dangerous tendency; at the same time one which has in several instances of late years been performed with complete success. Vegetius speaks of "horses being incommoded with the stone;" and gives directions "to put your fingers through the holes made in the rectum and bladder, and with an instrument to take out the stone." And this is certainly the simplest mode of procedure; though, in regard to its effects, we are informed by Chabert, that he has on several occasions practised it with results too varying to advise its repetition.

There are still two other ways of cutting into the bladder: one called the *high operation*—in veterinary practice it becomes the *low* one; the other, the *lateral operation*. The former is one now not at all in favour among surgeons, and for the same reasons—which it is not worth while here to enter into—cannot be safely adopted by the veterinarian: we will, therefore, proceed at once to the consideration of the *lateral* or ordinary operation for

LITHOTOMY.—The earliest account we have of this operation being performed in our own country is published in *The Farrier and Naturalist* for 1829, from which I here extract it:—

"We have been favoured by Mr. Randall, of Rotherhithe, with the inspection of a calculus, taken from the bladder of a horse about forty-six years ago.

* Elements of Surgery. By Robert Liston. 1840.

It now weighs five and a half ounces, has a rough and uneven surface, from which a portion has been chipped off, and its general outline approaches very near to the shape of an egg. The calculus belongs to Mr. Thomas Bidwell, of Swafeld, in Norfolk, and was taken from a horse belonging to his grandfather, which had been under the care of a farrier in the neighbourhood, named Miller, who considered the horse to be labouring under disease of the kidneys. The operation was performed by Dr. Shorting, then in surgical practice at North Walsham, and the horse lived for some time afterwards. Mr. Bidwell is unable to furnish the particulars of the operation, he being at the time quite a lad; but can recollect seeing the horse cast and secured in the orchard, and the stone extracted; from which time it has remained in the possession of his family and himself."

The next account of lithotomy comes to us through *The London Medical and Physical Journal* for October 1824, to which it appears to have been sent by the late Mr. White, V.S. 1st or Royal Dragoons.

Mr. Mogford, formerly a pupil and assistant of Mr. White's, then in practice at North Lew, near Oakhampton, Devon, was sent for by James Veal, Esq., near Hatherleigh, to attend a horse, who, from being troublesome to break, had experienced very rough usage, and been hard ridden. There was a "peculiar stiffness in the movement of the hind legs; urine of a high colour and pungent smell, and a dribbling of urine from the penis for some time after staling." By venesection, clysters, fomentations, &c. he got sufficiently well to be sent to grass. He there leaped over a gate, which caused a return of his complaint; and Mr. M. was sent for again, and found him in the same state as before. This time Mr. M. examined the bladder through the rectum, and felt a hard substance, which appeared to be a stone; in which opinion he was confirmed by Mr. Fisher, a surgeon of Hatherleigh. The following operation was performed:—A whalebone rod was passed through the penis; the end of which, felt in the perineum, was cut down upon, and through the opening thus made a director was introduced, "and with a probe-pointed bistoury the opening continued as far as the left side of the anus." Mr. M. "then introduced his right hand into the rectum, and the two fore fingers of his left hand into the bladder, and without any difficulty pushed the stone against the middle finger, by which he guided it to the neck of the bladder, and then easily forced it out through the opening in the urethra. The stone weighed four and a half ounces."

These cases are, chronologically, followed by others occurring to Messrs. Sewell, Dick, Taylor, and Robinson. Mr. Sewell's—the present Professor's—case stands remarkable in our annals for having been sent to the College of Physicians, notwithstanding there were

at the time of its occurrence two veterinary journals as well as two veterinary societies in existence; for which unfortunate predilection the physicians made the sad return of taking no more notice of the case than they would have done of any other horse or veterinary affair, and for which disregard of his own profession Mr. Sewell brought upon himself the censure of both veterinary journals and societies, and also that, I am afraid, of a host of practitioners besides.

Mr. Sewell's patient was a horse belonging to the Hon. G. A. Broderick, twelve years old, that had been hunted for seven seasons, and up to the period of his admission into the Veterinary College. He had for some months passed very high-coloured and turbid urine, mixed occasionally with blood, and had expressed great pain in the acts, with vain attempts to expel more. These symptoms became increased after a fall into a ditch, by which it was supposed he had injured his kidneys; for afterwards the attempts to stale became more frequent and painful, and pure blood came away. Aperients and light diet relieved, but work brought back his complaints. Suspecting calculus, Mr. Sewell examined the bladder per rectum, and "distinctly felt a firm roundish substance at the neck of the bladder, which was empty and firmly contracted upon it." On a subsequent day Mr. S. renewed the examination, "when the bladder was nearly full," and could then "move the stone very readily." The horse was admitted a patient on the 14th February. On the 26th "he appeared to be in a favourable state for the operation of lithotomy. The horse was accordingly cast and secured, turned upon his back, with his hind legs drawn forwards to the shoulders." The penis being drawn out, a three-foot whalebone staff was introduced as far as the perineum, and the urethra opened by an incision about three inches in length. A grooved sound was then passed straight into the bladder, and the stone was distinctly felt, and heard on being struck. It was attempted to be extracted without cutting open the pelvic portion of the urethra and neck of the bladder; being readily grasped by the forceps, assisted by pressure made upon the calculus by the left hand introduced into the rectum; but being too large, these parts were laid open by lateral incision, made by a strong curved and probe-pointed bistoury. It was then by the same means, but with considerable force, brought gradually forward to the perineum, where it was forcibly contracted upon, and a farther extension of the external incision was necessarily made to effect its removal."—"The hæmorrhage was not very great or alarming; but it was thought best to secure a perineal vessel with ligature."—"The calculus is of the mulberry kind, very rough, of a depressed oval form, weighing nearly three ounces. It has no distinct nucleus. Dr. Prout having obligingly undertaken to analyse it, found it composed principally of carbonate of lime, some phosphate of lime, and a little phosphate of

magnesia."—"The horse immediately after the operation became tranquil and cheerful, and the pulse by the evening fell to the healthy standard, and so continued until the following day, when, being rather agitated by numerous visitors, it rose to 38, and by night to 45. Four quarts of blood were taken from the jugular vein, a mild purge given, and frequent clysters."—"February 28, Pulse 40 and 44; bowels relaxed.—March 1, Pulse 44; purge and clysters repeated." The pulse continued down; and the bowels were kept open by aperient doses of aloes and clysters. The urine passed partly by the wound until March 2, on which day, the parts being healed, all of it flowed through the natural channel. "The horse is daily exercised and fit to be discharged." *Veterinarian* for 1829, from the *Medical Gazette*.

In reply to a letter requesting to be informed of the result of this case, Professor Sewell kindly sent me the following particulars; and annexed to them brief accounts of two other cases which have occurred at the Veterinary College:—

After being discharged on the 2d of April, the horse was turned out for two months, affected, it was said, with an incontinence of urine. While he remained out the weather proved very unfavourable, and he gradually declined in health. In this state he was returned to his former owner, who had him destroyed the following July. The urinary apparatus were sent to the College for examination. The coats of the bladder were thickened, but, otherwise, healthy in appearance. The incision made through its neck, membranous part of the urethra, and perineum, was quite healed. The right kidney and ureter were enlarged, and contained purulent matter, the consequences of the formation and descent of a fresh calculus, which was found lodged within the canal about three inches before its termination in the bladder. Its hardness and roughness and irregular shape appeared to have stayed its progress into the bladder. Some small calculi were also found within the kidney. To these irritations Mr. Sewell ascribes, sympathetically, the incontinence of urine.

The next case was a small thorough-bred horse—a racer. The calculus, which was about the same size and form as the preceding one, was extracted by a similar operation. He was worked regularly for two years afterwards, and subsequently sold, in consequence of his owner not requiring his services any longer.

The third case was a stout chaise horse. The same operation proved entirely successful. The horse has been actively worked since. The calculus proved rather larger than in the other cases.

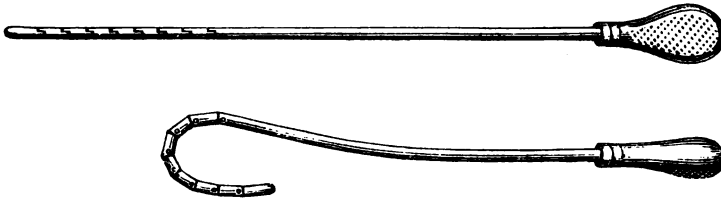
MR. ADAM POPE, TAEVIS, ABERDEENSHIRE, wrote to Mr. Dick, requesting his advice concerning a mare, who every ten minutes was discharging her urine, and so suddenly that she had not time to camp herself; the consequence of which was, the running of the urine down her thighs and legs, ex-

coriating them. Her urine was tinged with blood. Mr. Dick conceived the case might be one of stone, and recommended manual examination, and the extraction of it by dilatation. Mr. D.'s opinion proved correct; and Mr. P. proceeded to the operation "by introducing the left hand into the rectum, and with it pressing the stone towards the opening of the urethra.—"I had thus a full view of the orifice; but finding, from the size of the calculus, that it would require an uncommonly large wound to allow of the extraction of the stone in one piece, I merely dilated the urethra by making an incision about an inch and a half in length; and then, introducing a pair of forceps, I took hold of the stone, and broke it down. This was the more easily effected from the circumstance of the stone being of a conglomerated texture. I then gradually removed the substance, piecemeal, which, when collected together, weighed upwards of eight ounces." The calculus was analysed by Dr. Murray, and found to be composed of forty parts of carbonate of lime, sixty of animal matter, apparently mucus of the bladder and albumen indurated. A twelvemonth afterwards Mr. Pope found the mare "about as ill as ever." "There was new stone formed; but the urine was mixed with sand." Mr. P. tried muriatic acid, but gave it up from the difficulty of administering it. At length she was destroyed. *Autopsy*.—The left kidney greatly enlarged; the right less than usual, and containing, in its pelvis, a stone weighing one ounce and a half, and in its tubuli several small calculi. "Most of the tubuli uriferi were enlarged into cysts, containing, in both kidneys, a mixture of sand, urine, and pus." The parenchymatous substance was rotten, crumbling down between the fingers. Mr. P. concludes with the conviction that the mare must soon have died from emaciation; that her whole complaint was in the kidneys; that it was incurable; and that applications to the bladder were futile.—*The Veterinarian* for 1833.

The next case comes from Mr. C. Taylor, V.S., Nottingham. It is one doubly interesting, from the circumstance of its introducing a new instrument to our notice:—

Mr. T. was called to attend a chestnut hunter, belonging to Mr. Wright, a surgeon, by whom Mr. T. was afterwards assisted in his operation. "The horse passed bloody urine, with frequent attempts to evacuate the bladder, and which took place almost invariably after exercise, and more so after quick exertion." On examination Mr. T. discovered "a solid body about the size of a pullet's egg within the bladder, near its neck, and which was moveable." Prior to operating, Mr. T. was desirous to try if he could not invent some sort of sound which would pass at once into the bladder; and in this he succeeded. "It was of polished round iron, three feet long, one inch and a half in circumference, with eight joints at its further extremity," or rather half-joints, so that the moveable part could only act in a straight line and curve in

one direction, and be perfectly smooth either when straight or bent*. Here the instrument is represented both in its straight and curved state.



The following is Mr. Taylor's account of the operation in his own words:—
 “April 1, 1833, 9 o'clock A.M.—The horse (having been previously prepared by physic and bran diet) was cast, and secured on his back as for castration, and bolstered in that situation with two sacks of corn firmly tied up. Having the penis drawn from the sheath by an assistant (the rectum having been previously emptied), I endeavoured to inject the bladder with warm water, but was only able to distend the urethra, from the resisting contraction of the sphincter. I then passed my jointed sound into the bladder, and, having given it to an assistant to hold, pushed my hand into the rectum, and brought the body in the bladder into contact with it, and the assistant was satisfied it was a stone that struck the end of the sound. Continuing this instrument in the bladder, held by the assistant, I placed the fingers of my left hand upon the perineum, opposite the symphysis pubis, and, drawing the integuments up, kept the parts tense. I then commenced the external incision immediately below the arch of the pubes, close on the left of the raphe, and continued it down obliquely by the side of the anus, making the external wound three inches and a half in length. I then divided the fasciæ and transversalis perinæi muscle, and introduced the fore-finger of my left hand into the wound, and distinctly felt the pudic artery where it enters the bulb. I kept my finger upon it, and carried on my deeper incision below it, laterally, down by the side of the rectum, through the connecting cellular texture, occasionally feeling for the sound in the urethra, which I cut down upon in its membranous part, beyond the bulb, though with some little difficulty, which I apprehend was in consequence of the jointed part being moveable. A straight-fluted staff was then introduced into the bladder, through the opening in the urethra, and the calculus again distinctly felt and heard on being struck. The sound was withdrawn, the forceps introduced, and the stone attempted to be extracted, supposing from its size, compared with the dilatability of the neck of the bladder, that it might be extracted without division of the neck; but that not being practicable on account of the sphincter forcibly contracting, the fore-finger of the left hand was introduced into the bladder, which

* For a minute description of the instrument see *The Veterinarian* for 1834.

served as a director to a long probe-pointed bistoury, which was then passed within the neck of the bladder, and its division completed by withdrawing the bistoury, keeping the edge downwards and outwards in a line with the external wound. The calculus was then easily extracted. It was of the size of a small pullet's egg, rough on its surface, with a pungent urinary smell, sandy texture, being easily broken, and of a light nature, weighing not quite three ounces. The hæmorrhage was trifling, and I did not find it requisite to take up a single branch of the small arteries necessarily divided. The bladder was washed out with warm water, by using a patent syringe, and two sutures were applied by the side of the anus, connecting it with the common integuments." No unfavourable symptom appeared. The horse rose well, and had a draught of tinct. opii ʒss in aquæ Oj. At three o'clock P.M., the pulse being 48, and full and hard, he was bled to four quarts. He passed his urine principally by the urethra. He was tied up with two halters, and a man sat up with him. *April 2d.*—Discharges his urine (which is tinged with blood) partly by the wound and partly by the urethra; appetite good; bowels regular; no medicine necessary. Let loose in a box at day; tied up at night as before; and a man sat up. *3d.*—Suppuration in the wound. Urine evacuated from the wound principally, and in a gush, and still bloody.—*4th*, Healthy suppuration. Urine principally from the wound, but no longer bloody.—*5th*, Lay down at night.—*6th*, Had an inflammatory swelling on the left of the sacrum and above the ischium, which was fomented.—*7th*, The swelling subsiding. Urine passes partly through the wound.—*8th*, Swelling nearly gone, and a similar one coming on the right of the sacrum, which was fomented.—*9th*, Swellings disappearing.—*10th*, Wound granulating. Urine passing principally by the urethra.—*11th*, But little suppuration. Granulation luxuriant.—*12th*, Wound contracting.—*14th*, Passed two quarts of urine by the urethra; none by the wound.—*15th*, Observed loss of flesh about the quarters and loins; though all continues going on well. Clear urine passes by the urethra; none by the wound, which is nearly healed.—*22d*, Wound perfectly healed, and his urine discharged the same as in health, both as to times and quantities.—*23d* to *27th*, Daily walking exercise in hand.—*28th*, Was ridden a short distance.—*29th*, Discharged, quite well.—Mr. Taylor concludes a case, so highly creditable to his professional character, in these words:—"I consider that the successful result of the operation is mainly attributable to the opening in the urethra being made in its membranous part, and which could not well have been carried into effect without the jointed sound, which acted as a principal guide in the operation, and also the urethra not being laid open to any extent."—*Veterinarian* for 1834.

One more case stands on record. It happened to Mr. Robinson, V.S., Tamworth, who sent an account of it to *The Veterinarian* for 1837, from which our extract is taken. Among other interest

it possesses, it appears to confirm the utility of Mr. Taylor's jointed sound.

A favourite black horse (Jack), the property of H. C. Hindle, Esq., Mayfield, Walsall, was in April 1836 brought to Mr. Robinson for his opinion. His symptoms, which had been noticed for four months, were described to be "frequent and painful attempts to void his urine." The horse appeared, notwithstanding, in perfect health and spirits, and was quite fat, and had just been driven nine miles. Under these circumstances Mr. R. could give no opinion; but begged the horse might be sent to his infirmary. On the second day afterwards, Mr. R. "saw him attempt to empty the bladder by the usual process, and it was indeed a very painful effort to expel a few ounces of urine only. He continued to make great exertions, without changing his position, for further relief, but in vain." The bladder was examined per rectum, and "a large solid body found firmly fixed towards its neck." On a second examination, on the evening of the same day, the bladder was found distended with urine, and the substance could then be moved backwards to the fundus, which change instantly brought on the usual painful efforts for expulsion of it. Mr. Hindle was told that lithotomy was necessary; to the performance of which, "after a few months he gave consent." Accordingly, in the presence of several medical and veterinary gentlemen, the operation was set about as follows:—

The horse being secured as for castration, a whalebone probe was passed through the penis, and its end cut down upon in the perineum; "but from the struggles of the animal it was withdrawn, and the jointed sound introduced. The opening into the urethra was then enlarged, and the external incision carried obliquely down by the anus for about four inches. The fore finger of the left hand was then used as a director in opening the pelvic portion of the urethra and neck of the bladder. The forceps were found to be too weak, and inadequate for the extraction of the calculus, and a further division of the bladder was made, to admit the hand of Mr. Friend (considerably smaller than my own); but so firmly did the coats of the bladder adhere to the rough mulberry surface of the calculus, that it was with very great difficulty the fingers could be insinuated between them; and then so tenacious was the grasp with which it was held by the contractile power of the bladder, that it required considerable force to remove it." Only a few ounces of blood were lost: no ligatures necessary. The wound was sponged, and closed by three stitches. After being led into the stable the horse exhibited some symptoms of gripes, which were relieved by an injection containing six drachms of opium. The calculus was of the mulberry kind, weighed 1lb. troy, and measured nine inches by eight in circumference. It has been presented by Mr. H. to the Veterinary College Museum. A good deal of sloughing followed, so extensive being the wound; but all went on well, and on the 18th day afterwards the urine passed, exclusively, through the natural passage. Unfortunately, however, in the tenth week after the operation, from some sudden

and violent exertion, " he produced some disarrangement of parts in or near the neck of the bladder, from which he has never perfectly recovered. There began from that time, and has still continued to exist, a slight draining of urine occasionally by the urethra. There appears a partial power, however, to restrain this, as frequently there will be no discharge while he is being ridden or driven several miles, though it will commence again as soon as he stands still." Mr. R. suspects some fresh rupture of the wound in the neck of the bladder, which, though healed again, has left some loss of power in the sphincter ; or there may exist, he thinks, some scirrhous opening through the neck, which it cannot always close.

IN FRANCE lithotomy has on several occasions, by different practitioners, been performed with success. Girard recommends the operation upon the horse standing. And instead of introducing any sound or bougie through the penis, has the urethra and bladder filled by injection with warm water. The instruments he uses are, a long-bladed bistoury, a straight fluted sound, and a pair of forceps curved at the ends. He commences with an incision in the perinæum, two inches in length, upon the side of the distended urethra. Next, he pushes the point of the bistoury into the urethra, which he dilates sufficiently to admit the sound, to be now introduced, being passed onward into the bladder. Sliding the back of the bistoury along the groove in the sound, he divides the urethra, and also, in part, the neck of the bladder, which latter he completes the section of as he withdraws the bistoury. Lastly, he introduces the forceps, and seizes the stone across its short axis, in which he assists himself by having at the time his other hand insinuated per rectum. He lays much importance on the necessity of making the incision through the urethra and bladder *obliquely to one side*, which is insured by keeping the cutting edge of the bistoury turned outwards, towards the angle of the thigh : a mode of procedure which facilitates the dilatation of the parts, while it guards the operator from wounding the rectum, from opening either the artery of the bulb or that of the urethra, and from dividing the suspensory ligaments of the penis.

MODERN SURGICAL IMPROVEMENTS suggest to us the possibility of extracting a calculus from the bladder of the male animal by the same means as are practised in the case of the female. When the urethra of the male comes to be opened in the peri-

næum, and the passage into the bladder is thereby reduced from a sharp curve to nearly a straight line, it appears to me to afford all—or nearly all—the facility for an experiment of this kind that the female urethra presents; and that we have only to furnish ourselves with proper instruments for dilating the passage, and breaking the stone, should that be required, to, in some cases at least, succeed without the necessity of slitting up the urethra and bladder: at all events, when the calculus is small or of a friable sort, such simple means, I think, ought to be tried before the formidable operation of lithotomy be determined on.

CYSTITIS—CYSTORRHOEA.

THE first of these terms appears to be most generally used to denote inflammation of the entire substance of the bladder; the latter, any inflammation attended with flux of its lining membrane, or even the flux alone: to this last affection has likewise been given the appellation of *vesical catarrh*.

I know of no instance of cystitis in the horse; though it is a disease which might occur, indeed would be very likely to follow any injury of a mechanical or chemical nature. And should acute inflammation attack the bladder, the symptoms would certainly be of a very painful and distressing kind; such as would call for prompt and potent antiphlogistic measures, and at the same time require a deal of soothing treatment to allay the extreme irritation that would be sure to be present.

Two notable cases of cystorrhœa used to be related by the late Professor Coleman in his lectures.

The Professor received a message to attend two mares, dangerously ill, belonging to General Brownrig. Finding on his arrival one of them dead, he had her body opened at once, with a view of throwing a light on the nature of the disease under which the other continued to suffer the extremest agony: the symptoms in both cases being analagous. The mucous coat of the bladder was discovered in a high state of inflammation, in places mortified and eroded through, apparently by some caustic substance: a suspicion which was afterwards confirmed by the admission of the coachman that he had introduced some such substance—by mistake into the bladder—with the intention of exciting the mares to become horsing. By active depletion and copious injections of tepid water into the bladder the survivor was recovered

ISCHURY—DYSURY—STRANGURY.

THE first of these terms denotes a total suppression of urine; the two others, but a partial arrest: *dysury* implying a difficulty in staling; *strangury*, a painful and frequent staling by drops only. In common parley we often make use of the phrases *suppression* and *retention* of urine synonymously; though the former, properly speaking, signifies that no urine is secreted—that there is none in the bladder; the latter, that the bladder is full without the power of evacuation.

VARIOUS CAUSES may give rise to a suppression or retention of urine. The kidneys may be in that state in which they no longer retain the power of secretion: inflammation may put a stop to their function as it does to the functions of other glands. Spasm at the neck of the bladder—which, I believe, occasionally attends colic—may cause ischury or dysury. A calculus may give rise to dysury or strangury. Paralysis of the bladder may likewise prove the occasion of it.

TO DRAW OFF A HORSE'S URINE, but a few years ago we were told we had no resource in the male but to cut into the urethra through the perinæum: we now know that a flexible gum catheter, in the hands of a skilful veterinarian, is, in the healthy state of the parts, capable of being passed through the entire passage; and we may add, there seems reason to hope that Mr. Taylor's jointed sound may lead to the invention of some sort of flexible or jointed metallic catheter. This is the more to be desired from the acknowledged inefficiency of the gum instrument in cases wherein any resistance or obstruction is to be overcome. Fortunately for himself and for us, the horse, however, is not the subject either of stricture of the urethra or of diseased prostate glands.

THE OPERATION OF CUTTING INTO THE PERINÆUM must still be had recourse to in cases in which the flexible catheter cannot be introduced. It consists in passing a full-sized whalebone staff, flattened and grooved at the end, through the penis, until its extremity be felt by the other hand protruding in the perinæum.

Upon it, in this situation, an incision is to be made, laying open the urethra to a sufficient extent to admit the introduction of the straight or female metallic catheter into the bladder. This is an operation very easy of performance, and one that must at all times supersede the necessity for puncturing or

TAPPING THE BLADDER, as it is commonly called. Still, there may happen cases in which even the straight catheter introduced *per perinæum* cannot be made to enter the bladder; and as the organ in a state of distention must be, some how or other, relieved, or it will burst, it is right we should inform ourselves of the alternative mode of operating, viz., tapping the bladder. One method of doing this consists in carrying a curved trocar in one hand into the rectum, and plunging it through the gut into the prominence of the bladder felt below: the other, or *low* operation—corresponding to the *high* one in human surgery—is stabbing the bladder with a straight trocar of sufficient length immediately above and in front of the pubes through the recti muscles. Taking into consideration the horizontal posture of the animal, the comparative facility with which it is practised, and the fact that punctured abdominal wounds are not of that dangerous character they bear in man, there appears to me reason to prefer the low to the intestinal operation: at the same time I feel it my duty to state, that this opinion has no other foundation than a theoretical one, grounded upon anatomical knowledge, having always myself, in practice, cut into the perinæum rather than have recourse to the trocar at all. No one, I should imagine, would like to risk casting a horse with a bladder distended to bursting; so, in the erect position, supposing the rectum to be the medium of puncture, the fluid would have to *ascend* to escape; whereas, through the pubes, the urine would certainly flow away most readily. Mr. Cartwright, who has penned some very sensible practical observations on this subject in *The Veterinarian* for 1831, apprehends that some intestine might be wounded, and seems persuaded that the peritoneum must be, in the pubal operation. Perhaps under *ordinary circumstances* the membrane would be likely to be so; but while the bladder continued in that altered condition and situation which a surcharge of urine gives it, I should not fear either of these consequences.

SECTION XV.

DISEASES OF THE ORGANS OF GENERATION.

IN THE MALE.*

DISEASE SIMILATING SYPHILIS
 URETHRITIS
 GONORRHOEA
 PHYMOSIS
 PARAPHYMOSIS
 AMPUTATION OF THE PENIS

IN THE FEMALE.

LEUCORRHOEA
 VAGINITIS
 TUMOURS ON THE VULVA
 HYSTERITIS
 HYSTERIA
 HYDROMETRA
 DISEASES OF THE OVARIES.

APPENDIX TO THE FIFTEENTH SECTION.

THE OPERATION OF CASTRATION | THE DISEASES INCIDENT TO IT.

PRELIMINARY OBSERVATIONS.

FERTILE and important as the subject of the diseases of the generative organs is to the human pathologist, it is one which presents but little interest for the veterinarian. In the absence of causes of a syphilitic nature, the horse, in comparison with man, appears but little subject to disease of his generative organs; so little, indeed, that British writers are all but silent on the subject: a proof that their practice—to which I may add my own—has afforded very few such cases for treatment. The custom of castration in our own country, in depriving the animal of two important glandular organs, has liberated him from passions and sympathies

* The custom of castration in this country has rendered all notice of the *diseases of the testicles* unnecessary: at least, such could only prove of service to veterinarians practising in parts of the country where racing establishments exist, from the observations of whom, indeed, they must be furnished.

of the most influential nature, and constitutes, in the male, another reason for the rarity of disorder of the sexual parts; at the same time that it accounts in some measure for the difference between our own circumscribed list of the diseases of these parts and the comparatively extended one presented to us by veterinarians of those countries in which castration is not generally practised.

D'Arboval, with disgust and indignation, repudiates the idea of animals being the subjects of syphilis. He justly observes, that we now well know that *lues venerea* is a disease peculiar to man; that it can have but one and that a specific origin; and that for animals to contract the disorder we must suppose an intercourse between them and human beings at once of the most unnatural and revolting description: adding, however, that such monstrous acts have been known to take place, although, as far as the animal—especially the horse—is concerned, connexion with any other than its own species and like is throughout nature observed to be most abhorrent. Notwithstanding this admitted fact, and notwithstanding the assertion raised upon it by some one or more continental veterinarians, that the horse has been seen affected by syphilis, D'Arboval still maintains his disbelief in any such doctrines, and is only surprised that the College at Alfort should have countenanced them. His words are—"I have not passed through a long course of practice without meeting with cases which biassed minds might have taken for syphilis. I have had occasion particularly to observe and to treat irritations, inflammations, paraphimoses, discharges, ulcerations, &c. I have even remarked an obstinacy in some of these genital affections, with sympathetic swelling of the inguinal glands, and of one or both testicles, without, for all that, entertaining any notion of the disease being syphilitic. So far from it, I have always been contented with simple antiphlogistic treatment, modified as circumstances required; and I have never had cause to repent of not having introduced mercurials."

THE DISEASE MISTAKEN FOR SYPHILIS, according to D'Arboval's observation, "ordinarily commences by an inflammatory irritation of the glans penis, which extends to the enveloping membrane, runs along the dorsum penis, and thence sometimes spreads upon the lining of the sheath. So long as no morbid exudation is

present, the parts continue tense and shining, and painful from inflammation; but as soon as any issue appears, the usual lubricative secretion becomes augmented and thicker, and acquires a strong, penetrating, fetid odour: sometimes the secretion is mingled with a whitish serosity, and the cuticle of the penis peels off in flakes. The irritation may give rise to phymosis or to paraphymosis. When partial, or exhibiting intensity only in certain points or places, little circumscribed patches of redness become apparent, succeeded by small vesicles, which break and leave little ulcers, considered improperly to be chancres. But the irritation does not confine itself to the part first attacked; it spreads to the membrane lining the urethra, connected sympathetically with the integument, and produces those morbid discharges known as *runnings* from the penis. And should the animal have connexion with the female while this running continues, the same sort of irritation may manifest itself in the vagina.

“CAUSES for this irritation may be found in the habitually uncleansed condition of the genitals of animals; in the divers accidents to which they are exposed; in the introduction of foreign substances into the sheath; in collections of concreted sebaceous matters underneath the prepuce; in any abuses in coitation; in acrid injections into the urethra, or in the presence of calculus or any other strange body within the canal.

“THE TREATMENT most suitable for these cases consists in applying tonic emollients so long as any serous exudation is present; refrigerents, when not: aided by nitred mucilaginous drinks and injections, and strict attention to diet and regimen. When the cuticle separates, to allay the irritability of the denuded parts we use narcotics either in decoction or aqueous solution. We are rarely compelled to have recourse to any phagedenic lotions, still more rarely to catheterics or caustics.

URETHRITIS—GONORRHOEA.

THE same irritation which now and then becomes manifest upon the exterior, may attack or extend to the interior of the penis; or it may be engendered exclusively within the urethra by causes

existing within the canal itself. This affection, like the foregoing, is extremely rare in its occurrence—so rare, indeed, in our own country, that for any account of it we are forced to borrow from the continent. When accompanied by any discharge, the disease will assume the form of *gonorrhœa*: in fact, when running constitutes the only complaint—all inflammation having left—the urethritis becomes, in the nosology of Cullen, a veritable *gonorrhœa pura vel benigna*. I have seen a well-marked case of this in a dog, but never in a horse.

THE CAUSES, according to D'Arboval, are divisible into such as are *direct* and *local*, *indirect* and *internal*. "The former comprise foreign substances within the canal, and too frequent acts of copulation, especially with a female having vaginitis, or in whom the vagina is small compared to the size of the organ of the male. Among the second class of causes come different irritations of the alimentary canal; drenches or balls of cantharides given sometimes to reinvigorate the stone-horse; the presence of ascarides within the rectum; metastasis of irritation; inflammation in the bladder; retention of urine.

"SYMPTOMS.—It is difficult to detect the beginning of an affection of this kind, and almost impossible to say what amount of pungency or scalding the horse may experience, unless it be great enough to create pain; and then the horse, while in the act of stalling, may be observed to cast looks back at his flank, stamp with his feet, and shake his tail about, and, having finished, to moan and express a good deal of uneasiness, as if he felt a veritable *ardor urinæ*. There is no examining the penis unless it be drawn; and to induce a horse to draw a mare may be shewn him: the orifice of the urethra may then be observed to be red and tumid, and to issue a little mucous discharge. Some few days afterwards the desire to stale becomes more frequent, and the emissions of urine more painful; the running also increases and grows thicker, turns yellow or green, and is capable of being forced out by pressure from above downwards; the end of the penis and the prepuce become swollen; and all this is accompanied by frequent and painful erections. When the inflammation runs high, pressure upon the penis occasions a great deal of pain in the urethra, bloody streaks are per-

ceptible in the discharge, and so great is the tumidity of the membrane of the urethra, that the urine can be emitted but in small jets or drops, and with considerable difficulty and pain. Erections become more frequent and painful; the penis grows curved; and engorgement of the testicles, spermatic cords, and scrotum or sheath, supervene. The testicles hang lower than usual; sometimes they swell, and grow hard and painful, in particular the epididymes; the spermatic cord partakes of all this, and occasionally presents the appearance of *champignon*. Besides this, ulcerations may be observable upon the body of the penis, particularly about its lower extremity; and buds or kinds of nodosities with large bases, and more or less developed and prominent, are found firmly adherent to the corpus cavernosum, and raising the skin up from it. These ulcerations vary in extent; sometimes they possess callous elevated borders and livid bases. Lastly, the fossa navicularis at times sends forth some red exuberant granulations, which we may take as an indication that the interior of the urethra is in a state of ulceration.

“ THIS AFFECTION IS COMPLICATED now and then with the disorder of some other mucous membrane, commonly of the bronchitic or enteritic character.

“ THE TREATMENT is necessarily antiphlogistic. Tepid, bland, nitred, mucilaginous fluids both offered as drink, in lieu of water, and given as drenches: green meat, or when that cannot be got, some good straw; roots, such as carrots and turnips; vapour bath or fomentations; clysters; and the application of some sort of suspensory bandage to keep the testicles up and relieve the cords, constitute the remedial means indicated in slight cases: but when the inflammation runs high, there will be necessity for frequent fomentations; for cataplasms, which may be retained by the suspensory bandage; for applying leeches upon the penis; and in some cases for one or two general blood-lettings. Should the pains experienced be very great, laudanum may be added to the drenches; the fomentations and poultices may likewise be rendered narcotic. When the testicles become affected, the leeches may be oftener applied, and in greater numbers.

“ ASTRINGENTS AND DISCUTIENTS will be required as soon as

all pain has left, and the inflammation has abated. We must commence with the weakest. The fumes of vinegar, the vegeto-mineral water, the solution of diacetate of lead, or alum dissolved in strong vinegar may be employed. Champignon, or other intractable ulcerations, must be touched with lunar caustic."

PHYMOSIS.

PHYMOSIS—from *φίμωσις* a bridle—denotes that morbid condition of the prepuce or sheath which, from contraction of the orifice, prevents the drawing or exit of the penis. In man, phymosis may arise from natural causes; but in animals I believe it will be found to be always the effect of disease. Our best source of information on the subject is D'Arboval's Dictionary: from this we learn that

"Phymosis is ordinarily the product either of inflammation and engorgement of the prepuce, round about its orifice, or of tumefaction of the glans penis, or of the co-existence of these morbid states. Blows, kicks, contusions, wounds, abscesses within the sheath, the presence of warts or excrescences of any kind, polypi even, may all be set down as occasional causes. In geldings the penis becomes diminished in volume and length, so much so in some horses as not to appear protruded in the act of staling; in which case the sebaceous secretion furnished by the interior of the prepuce accumulates within the folds of the integument, and acquires by detention irritating properties which cause the glans penis to inflame and swell to that degree that the animal can no longer pass his urine. The consequence of this is, that the animal stales inwardly—*pisse dedans*, as the French phrase goes. And the presence of the urine in time causes concretions within the cavity and around the glans, or anormal growths, or ulceration of the prepuce, or such an inflammatory engorgement of the parts as will be likely to end in gangrene. Such an event puts a stop to copulation, and often ends in paraphymosis.

"The most common and favourable termination of all this is resolution, and such may reasonably be expected while the inflammation is but moderate, or shews a disposition to yield. To effect it we must employ active antiphlogistic treatment with emollient and

narcotic fomentations, poultices, &c., such, in fact, as are recommended for urethritis. In addition, we may abstract blood from the superficial abdominal veins, and by way of general blood-letting, from the saphena veins. Leeches and scarifications may also be advantageously employed, followed up by vapour fomentations and poultices.

“THE OPERATION FOR PHYMOSIS is rarely required. Unless there be concealed ulcerations, or concretions, or granulations, that call for it. And then the prepuce must be slit far enough back to allow of its retraction; by which all subjacent disorder becomes exposed, and, being treated as it may require, is speedily cured.

“The following case shews that phymosis may prove the forerunner of serious mischief:—

“A mule, two years old, had a considerable swelling of the sheath and surrounding parts, in which points of suppuration had made their appearance. The urine came away by drops. There was phymosis. M. Maupis learnt that two months before some warts had been excised, and that since, the skin had become indurated and thickened around the orifice of the prepuce. The mule being cast, the contracted preputial orifice was dilated, and openings and counter-openings were made in the surrounding parts. For twelve days afterwards the animal continued amending, when one morning he was discovered agitated, stamping, trying every moment to stale, and trembling. But little urine passed; the glans penis was very much swollen; and the pulse very quick. We were about examining into the state of the bladder, when the mule threw himself down, then rose again, and in the effort discharged a quantity of highly offensive urine per anum. This relieved him; though he still continued to strain, and every now and then passed more urine as before. Notwithstanding there must have existed here a urethro-rectal fistula, not many days elapsed before it healed; for the urine again took its natural course, and the animal perfectly recovered.”

PARAPHYMOSIS

Is the opposite to phymosis. Instead of the penis being confined within its sheath, it is protruded out, and cannot be drawn in again. This may arise either from the prepuce being in that inflamed tumefied condition that in its retracted state it becomes tightly girthed round about the neck of the glans penis, forming a sort of

bridling or strangulation of it; or, from the glans itself swelling to that degree that the prepuce cannot be drawn forward over it.

D'ARBOVAL informs us, that paraphymosis is seen sometimes in horses, but oftener in dogs; and that the stone-horse is more subject to it than the gelding.

"IN THE HORSE it may be the result of accident, of an operation, of castration. In the stallion it may proceed from excessive venereal action; from long and continued friction before coitus against the female; from strokes with a whip or stick upon the yard while in a state of erection; from kicks upon the part, which the male renders himself subject to in attempts to cover a vicious mare; from the introduction of the penis into the anus of the mare; from the negligence or *mal-adresse* of the groom in directing the penis into the vagina; from vain attempts to cover a ringed mare (*jument bouclée*); from introduction of irritating substances into the prepuce with a view of causing staling; from the penis becoming loaded with warts, or scirrhus or other excrescences. Chabert saw a stallion having an enormous paraphymosis and involuntary discharges of semen, occasioned by fretting and harassing himself during the night after other horses.

"The penis, paraphymosed, appears protruded out of its sheath to the extent of about half a foot, swollen to the size, perhaps, of a man's thigh, evidently in consequence of effusion into the cellular tissue of its envelopes, and is curved in the form of an arc, and knotted from partial circular contractions, which, when excessive, are productive of coldness of the organ. Its extremity, the part most tumefied, turns of a red brown. Violent inflammation accompanies all this, and the consequent pain is extreme. For all there is so much swelling, however, in general the urine gets a passage. Though, should the inflammation run very high, and spread to the body of the penis, gangrene may be the result.

TREATMENT.—In favourable cases, cold bathing in some river or lotions of iced water effect the reduction of the penis: caution, however, is necessary in the use of these means. In other cases, emollient remedies succeed best, and particularly in such as are the consequence of inflammatory engorgement, from continued erection, or the irritation of covering. Should the protruded por-

tion of the penis be very much inflamed and painful, vapour baths may be employed to it, and emollient poultices applied, with the aid of the suspensory bandage. These means prove of no avail, however, when the paraphymosis is extreme; local blood-lettings by leeches or scarifications must in this case be adopted; free evacuation of blood being the only thing to cause a reduction, either spontaneously or with assistance from the practitioner.

M. Dehan attended a colt, four months old, for paraphymosis, with extreme tumefaction. He made eight pretty extensive incisions into the swollen parts, which produced an abundant issue of blood. The following morning the swelling was considerably reduced, as well as the concomitant fever, and there was return of appetite. Four additional scarifications were made. The morning after, the yard had begun to recede within its sheath, and in two days more the colt was well.

To M. Lécocq occurred the case of a stallion who had escaped during the night from a field wherein he was turned, and got into an enclosure where there were some mares. The next morning he was found with his penis greatly swollen, and with difficulty in passing his urine. The protruded yard was curved from before backward, and exceeded in volume a man's head; it also felt hot, and pressure upon it caused pain, though the horse bore its being handled. The testicles were not affected. The pulse was full, and quicker than natural. Lécocq was not called in until the third day after the accident had happened. The enormous amount of tumefaction forbidding all hope of resolution, M. Lécocq made five incisions upon the anterior surface of the penis, each about eight centimetres in length and three in depth. From these blood, mingled with serous effusion, issued in tolerable abundance, and, with the aid of fomentation, continued for four hours, thus superseding all necessity for general blood-letting. The next day, the tumefaction, though diminished, still being considerable, four fresh incisions, of less length and depth, were made between the former ones. The day after the penis was not half the size, and the pulse was normal. Suppuration soon commenced, after which the wounds rapidly healed and cicatrized.

“We might probably obtain the same result by the application of a great many leeches, cold lotions, and strict regimen: to which might be added, general blood-letting, should it be required. In regard to scarifications, they ought always to be made lengthwise, and along the superior and lateral parts of the penis, so as to run no risk of puncturing the urethra. Exercise, when the case permits it, will also prove useful. In scarifying the sheath let the

incisions be sufficiently deep to penetrate it, and extensive enough to set the penis at liberty. We need not be afraid of making scarifications too lengthy, inasmuch as they become small enough on the parts recovering their natural volume.

“Should not these measures prove of avail in procuring or rendering spontaneous the return of the penis within its sheath, they will, at all events, diminish pain and inflammation, and facilitate the steps next to be taken for its reduction: in fact, proceeding to any operation without such preparatory means might make the case a great deal worse than it was at first. The operation for paraphymosis consists in passing a curved sharp-pointed bistoury underneath the stricture, and dividing it, and doing this in as many places and to as great an extent as is required for the complete liberation of the yard. Any hæmorrhage that may follow will prove beneficial in facilitating the reduction, and should therefore be encouraged by fomentation: afterwards poultices will be required.”

AMPUTATION OF THE PENIS.

THIS operation, formidable to the animal if not to the operator, has been performed a few times in this country as well as in France, it being one which extreme cases appear to render necessary. A state of disease, either of the penis or of its preputial covering, such as has resisted, or seems likely to resist, all ordinary treatment; or, indeed, such as would probably occupy any unreasonable length of time to cure, might, perhaps, warrant a recourse to amputation. Warts or excrescences, or enlargements of any description, intractable either from their magnitude or number, or from leaving behind them, after being removed, a disposition to reproduction; or extensive ulcerations of a phagedenic, foul, or malignant character; or paralysis or relaxation; or, in fact, any condition of parts preventing the retraction of a protruded penis within its sheath, may reasonably call for the performance of this operation. Different methods have been pursued in the performance of it, which, as well as the diseases for which it has been found requisite, will probably be best shewn by the recital of the cases themselves.

Huzard (senior) appears to have been one of the first veterinarians to practise the operation. His case was that of a gelding, whose penis was covered with chancres and warts. Calculating that he should have dangerous hæmorrhage, and foreseeing the difficulty, nay, impossibility of recovering the remainder of the penis once retracted within the sheath, Huzard determined on removing the diseased portion by ligature. To accomplish this object, he provided a hollow sound or catheter, of sufficient length to reach beyond the place proposed to be severed, and still to project sufficiently out of the penis to admit of being confined by some sort of circingle to the body. The end to be introduced terminated in a little bulb; the other end had a couple of rings affixed to it, for the greater facility of confining it. The animal being secured in an erect posture, the instrument is introduced into the urethra, and pushed on until its bulbous extremity is felt beyond the part proposed to be sloughed off. A ligature is then passed around the penis, immediately anterior to the bulb, and being properly adjusted, is made as tight as it can be drawn, with the view of strangulating all that portion of the organ which is left projecting in front of it. The other end of the instrument is afterwards, by means of its rings, confined sufficiently close against the belly to prevent any dependance of the parts, in which state of suspension the urine can readily flow through it. At the expiration of twenty-four or from that to forty-eight hours, mortification will have taken place of the superficial, and to a certain depth of the subjacent parts, and a fresh ligature will be required, the old one remaining undisturbed. This in the course of three or four days commonly reduces the constricted part to a mere pedicle, which may be safely severed with the knife. The sound may now be withdrawn, and the parts left to heal over. Should the orifice of the urethra afterwards become contracted, which will be manifested by the smallness of the stream of urine and its tardy manner of flowing, a gum catheter may be introduced, and confined within it for some time. Any constitutional irritation that may arise must be met by antiphlogistics.

M BARTHELEMY, in the year 1826, presented a paper on amputation of the penis to the Royal Academy of Medicine, detailing an interesting case for which he practised some very instructive and ingenious operations. The case consisted in relaxation, or a sort of paralysis of the penis, a sequela of a severe gastro-enteritis. Instead of pursuing Huzard's plan, Barthelemy preferred, as more expeditious and less painful, amputation with the knife, thinking the hæmorrhage would not prove dangerous—although he had to operate on an organ in a state of erection and nearly as large as his arm—from knowing that the arteries of the penis are not distended save during erection. He commenced by introducing a canula or hollow sound into the urethra, of sufficient length and size; and about an inch beyond the place chosen for excision, passed a flat ligature around the penis, so as to arrest hæmorrhage, and prevent the retraction of what remained into the sheath. "An assistant now grasped the end of the penis, while I with a straight bis-

toury performed the amputation; which was no sooner accomplished than away went the remnant, in spite of the ligature, into the sheath. It was impossible to re-introduce the canula. No hæmorrhage appeared at the moment; but there was some afterwards for a few days, every time demi-erection took place for the purpose of staling. Every thing went on pretty well until the thirtieth day, when some difficulty in staling occurred. On examination of the penis, it was found that this was owing to the process of cicatrization having drawn the skin over the urethral orifice, and that the urine had forced an artificial passage through a fistulous opening directed upward, whose outlet was through the middle of the cicatrix. There was no getting at the part to dilate this orifice and introduce the canula, and still the retention of the urine was increasing." Amidst these difficulties M. B. determined on a new operation. He made an incision into the urethra four inches above the ischial arch; but in proceeding, he met with so many unexpected difficulties that he was obliged to give the operation up. Undismayed by this failure, he practised a novel operation he intended upon some condemned horses first, and then commenced anew on his patient, by making a fresh incision between the old one and the ischial arch. Here the urethra was easily found, and a catheter being introduced, the bladder was emptied of its urine. The catheter being withdrawn, a pewter sound was introduced, and directed to the extremity of the penis, and the cicatrix there crucially divided, sufficiently to admit of a ready passage. An esophagus-tube was substituted in place of the sound, and confined within the canal by means of strips of waxed linen and strings, carried through the sides of the sheath, the same as setons, and the whole maintained for two months, at the end of which time, complete success crowned Barthelémy's enterprising operations. The author concludes his paper with these deductions:—1st, That amputation of the penis may be performed on the gelding without any apprehension from hæmorrhage; 2dly, that to avoid any obstruction of the urethra, a pipe should be placed in the canal, and by rings affixed to it, sustained therein for at least two months.

In our own country the operation has been practised by Professor Sewell and Mr. Snewing, of Coventry.

Mr. SEWELL's patient—whose case I extract from the *Farrier and Naturalist* for 1828—was a horse sent to the College by Messrs. Hanbury, with the penis hanging down, out of the sheath, considerably swollen and excoriated, apparently occasioned by a stricture of the prepuce. This in the course of a couple of months by leeches, Goulard lotion, bread and water poultices, fomentations, scarifications, suspensory bandages, purges, diuretics and rowels, was relieved, and the horse was discharged. A fortnight afterwards he was readmitted, with the penis swollen again, supposed to have been occasioned by some stimulating application having been used to the part. Some such treatment as had been before employed was recurred to, with the addition of blood-letting from the femoral vein, and the exhibition of doses of powdered white

hellebore in water. Six weeks after admission Mr. Sewell amputated the penis "by slow and cautious cuts," alternating the cuts with cauterizations. Considerable hæmorrhage followed the operation. After three weeks' further treatment, the horse was sent away with "enlargement and thickening of the sheath," though reduced from what it had been: "the part originally diseased still remaining."

Mr. SNEWING's patient was an aged pony which had been purchased ten days prior to the operation by his present owner, who, on riding him home, discovered, while he was in the act of staling, the penis unusually projected, but took no further notice of this until he came to alight, when he perceived the yard still drawn, and that it was bloody: there were also visible around the margin of the sheath marks of stitches, rendering it evident that means had been taken to brace up the organ, which, from some cause, had become incapable of being retracted. Vexed at the trick that had been played him, he sent for the knacker to dispatch the pony; the knacker, however, in a laudable spirit of humanity and disinterestedness, persuaded him first to seek medical advice. Mr. Snewing was sent for, and found the poor animal much emaciated, with "a mass of corruption"—as the owner described it—hanging from his belly, which was found to be a portion of penis in a state of ulceration, or rather gone on to gangrene, discharging "a thin watery sanious fluid, with blood, and highly offensive."—"There was also present what may be considered paraphymosis, arising from serous infiltration into the cellular tissue which connects together the convolutions of the sheath, producing strangury of the lower end of the penis." Mr. Snewing concluded that nothing but amputation close up to the groin could offer any chance of relief. Having washed the parts with a solution of chloride of lime to destroy the fætor, he included, after the manner of the caustic clams, between two long thin pieces of iron, the upper parts of the sheath and penis, and approximated their ends with strings sufficiently close to make the required compression. "I next proceeded," continues Mr. Snewing, "cautiously to incise the lower portion, securing by ligature in my progress the pudic arteries, and other vessels of importance. Near to the side of the penis I met with an encysted tumour, containing some thick crude offensive matter. On cutting through the urethra, a purulent matter escaped. Another cut carried my scalpel through the penis, which, by its retraction, prevented me securing a vessel on its dorsum, and which continued to bleed rather freely for a few minutes, partly, I presume, from the corpora cavernosa. Having completed the operation and released the animal from the rope, he got up immediately. I had him led into the stable, and though the parts then bled freely, in ten minutes the hæmorrhage ceased, and no untoward symptom afterwards made its appearance."

THE ORGANS OF GENERATION OF THE FEMALE, from the state of inaction in which they remain in all mares save such as are kept for the purposes of breeding, are not, any more than those of the male, found to be the seat of much disease; a circumstance quite in accordance with the general law of nature, which almost exempts that from derangement whose functions are suffered to lie dormant or are but rarely called into action. In breeding counties and establishments no doubt diseases of these organs are occasionally met with; but in common localities where no breeding is carried on, cases of the kind are but of rare occurrence: so that any account of the diseases connected with parturition, at the same time that it can prove of service only to the veterinarian in the former situation, can by him alone be accurately given. In ordinary practice we now and then meet with cases of

VAGINITIS AND LEUCORRHŒA.

VAGINITIS is the technical denomination for any inflammation, acute or chronic, existing in the vagina; and *leucorrhœa* and *fluor albus* are—the one Greek, the other Latin—appellations given to the discharges, which are generally white, ordinarily concomitant with, sometimes unaccompanied by, at other times remaining after, the inflammation of its mucous lining; the same, in point of fact, as happens in the nose or bladder, or any other mucous cavity, it being nothing more in reality than *a catarrh of the vagina*. Although mares in common use, not being allowed to breed, are never put to the horse, still as the warm and copulating season annually returns do they—or many of them—feel a relapse of the venereal œstrum, and during its continuance experience a sort of seminal emission, which is evidence to us that the female is in a condition to take the male. From causes which are not always evident, it would appear that this natural discharge occasionally continues much beyond its ordinary duration, assumes other than its natural characters, or comes on at the cold or winter season of the year, when its presence cannot be regarded as owing to normal causes, or as manifesting the usual indications. I have known several instances of

derangement of this kind. In some the discharge has appeared white like whey; in others it has assumed a yellow and even purulent character; very often the flux, though at first white or yellow, turns to a thin colourless emission, in appearance like water. The discharge collects within the fossa navicularis, and comes away every time the lips of the vulva are opened in a sort of gush. In general there is not much concomitant reddening of the inside of the vagina; in some cases only a faint blush, or there may be none whatever. In these cases, I have found serviceable such medicines as are known either to allay the irritability of mucous membranes, or to restrain their discharges: I have given once or twice a day a ball according to one of the subjoined formulæ.

Take of

Acetate of lead, ʒj
Opium, ʒj
Linseed or oatmeal, ʒss
Common turpentine sufficient
for a ball

Take of

Cantharides, gr. v
Linseed or oatmeal, ʒvj
Balsam of copaiba sufficient for
a ball

At the same time the practitioner should use—unless existing inflammation forbid it—an astringent injection four or five or six times a day. And, in addition, he will find useful cold affusion, or, where it can be had, cold bathing.

Take of

Sulphate of zinc, ʒj—ʒiv
Distilled water, Oj. Mix.

Take of

Decoction of oak bark, j
(double strength)
Sulphuric acid, ʒj. Mix.

It is a good plan to sprinkle common flour over the external genitals and thighs after using the injection. The watery flux will sometimes continue for weeks after the white running has ceased, and prove very troublesome to suppress.

VAGINITIS, in its acute form, in the absence of any external injury, I take to be a disease hardly ever occurring, unless it be in breeding mares, in whom such an affection would be very likely to follow some of the accidents liable to occur in the act of parturition: but of such occurrences I can only speak from hearsay, not being in the way myself of meeting with labour cases.

SCIRRHOUS TUMOUR UPON THE VULVA.—The *Compte Rendu* of the Transactions of the Veterinary School at Lyons, for the session 1837-8, contains the following remarkable case :—

A draught mare, employed in farming, six years old, that had never bred, exhibited a carcinomatous enlargement growing in the inferior commissure of her vulva, which had existed for two years. It being in a state of inflammation, she kicked violently when it was meddled with; and what with the irritation of the urine, the brushing of the tail upon it, and the pungency of the remedies that had been applied, the tumour had been rendered greater. When first brought to the school, the swelling measured two inches across, and had irregular, indurated, foetid ulcerations upon it. Simple treatment with lotions appeared to stay its progress for a time; but on her second visit, six months afterwards, the tumour was found to occupy at least two-thirds of the entire vulva, and had assumed the aspect of scirrhous, beset with tubercles and ulcers. To do any good in this state, excision of at least two-thirds of the labia became necessary. The mammary glands were found to have partaken of the scirrhus action. They were rubbed with mercurial and iodine ointment. Ill-conditioned purulent discharges succeeded the operation; the appetite began to fail; loss of flesh followed, with dropsical swellings of the legs and belly; and the local affection was becoming cancerous: she was in consequence destroyed.

Post-mortem.—The vaginal membrane deeply reddened and atrophied. An incision through it discovered a lardaceous tissue, studded with tubercles, with some surrounding infiltration. The mammary glands were in the first stage towards scirrhous. This case shews how long a cancerous affection may exist in, and confine itself to, one spot; for it was in the last stage only that this spread to the udder.

HYSTERITIS OR METRITIS.

INFLAMMATION of the womb appears to be a common disease in cows, but one of rare occurrence in mares: at least this is the inference we may fairly draw from the great deal we hear about the one, and the little we hear and know concerning the other. Indeed, it is only to such veterinarians as are engaged in practice in parts of the country where breeding is carried on, that cases of hysteritis are likely to occur: we know of no other causes for inflammation of the womb save such as are directly or indirectly connected with utero-gestation and parturition. The following

case, published in *The Veterinarian* for 1833, by Mr. Barker, V.S.; Stokesly, Yorkshire, is interesting, as well from its rarity as from its characteristic and strongly-marked symptoms and result, notwithstanding the account is but a brief one :—

“*Sept. 3d, 1833,*” says Mr. B., “I was sent for to a mare that had been ill all day. The principal symptoms were, lying down and getting up; lifting one hind leg and then the other; with a discharge of bloody fluid from the vagina. Pulse 80. She had been bled; but I took away eight quarts of blood more. I gave her an opiate enema, containing four ounces of tincture of opium, and two ounces of spirit of nitrous ether, in gruel; and an hour afterwards she had a ball, containing three drachms of aloes, with ten grains of calomel. *Sept. 4th.*—Pulse 75. I again bled her, and gave her a laxative ball, containing two drachms of aloes: a laxative enema was also administered. *Sept. 5th.*—Pulse 48. Give two drachms of aloes. *Sept. 6th.*—She is well, and gone to grass.”

Were I to venture an opinion on a case I had never seen, I should say that, in the treatment of the one above related, a *full dose* of cathartic medicine might with advantage have been administered in the first instance: in other respects, the management of the case appears to me extremely judicious.

HYSTERIA.

HURTREL D'ARBOVAL asks if the following case cannot be considered of this nature. It occurred to M. Guillaume, and was published in the *Mémoires de la Société Royale et Centrale d'Agriculture* for 1825.

A female ass shewed signs of horsing, in conjunction with some tetanic indications, which were referred to the presence of the venereal orgasm: among these were clenching of the jaws, grinding of the teeth, tardy and difficult mastication, and inconvenience in swallowing. At first the male was denied her. She was bled, and took a nitred decoction of valerian with sulphuric acid, and had enemata of asafetida dissolved in sulphuric acid, and frictions with camphorated liniment upon the cheeks, neck, and back and loins, which dissipated the nervous disorder; but left the horsing as before. She was now given a stallion ass: she took him, became with foal, and from that day recovered.

HYDROMETRA.

OF the extremely rare disease, dropsy of the womb, a case is chronicled by Gohier.

The uterus of an old mare grew so large that it spread and occupied the anterior region of the abdomen, and gave her the appearance of being with foal. This was found to be owing to distention of the uterus with six quarts of thick white matter, similar to what would be called laudable pus.

DISEASES OF THE OVARIES.

THE following cases comprise all the information I have been able to collect in this fallow-field of hippopathology : nine of them are quoted by D'Arboval—seven from M. Bouley, junior, the eighth from Lapoussée—the tenth is taken from the *Recueil de Médecine Vétérinaire*.

1. A mare, five years old, who had been eight days ailing, appeared suffering under slight colic : her tail shook, she walked stiffly, her belly was swollen, her back roached, and a fœtid sanious issue escaped from her vulva ; the udder also was tumefied, and by compression yielded a serous lactescent exudation. It was suspected she had metritis, having but a little while before foaled. Antiphlogistic treatment produced sensible amelioration at first ; but at the end of four days her fever and colics returned, the pulse became imperceptible, and on the sixth day she expired. A large quantity of red fluid was found effused into the abdomen ; the visceral surfaces of the peritoneum presented evident traces of inflammation ; the womb contained sanious matter ; its mucous membrane appeared in folds, reddened and thickened ; the right ovary was converted into a soft spheroid tumour, seven pounds in weight, and contained a blueish homogeneous, odourless fluid ; and its parietes, which had become much attenuated, were reddened and injected. The left ovary was double its natural volume, and contained several serous cysts.

2. Another mare, four years old, fell suddenly ill. Diminished appetite and gaiety were the only symptoms at first observed. These excited no apprehension until the fourth day, when they assumed an alarming character. The mare became gloomy and depressed, refused every kind of food, and appeared suffering some abdominal pain ; her pulse was 70, and rather full ; she walked stiffly, and had some difficulty in dunging ; and her dung was shiny. Notwithstanding she was bled, for three days there appeared no change. After this all her symptoms became exasperated : the colics more frequent and intense ; the pulse quicker and less perceptible ; partial sweats

bedewed the flanks; the belly seemed full of pain, particularly about the left flank; the loins were tense and inflexible. On the 10th day she died. The stomach and small intestines proved slightly inflamed. The left ovary was no longer in existence: a soft round mass, six pounds in weight, occupied its place, which contained a greyish, granulous, slightly odorous pus, and had fibrous parietes, thickened and injected. The mucous lining of the womb was likewise reddened and thickened. The right ovary, much larger than natural, consisted of a great number of small serous cysts.

3. A harness-mare, who had been at work for two years without experiencing the slightest indisposition, was suddenly, and without any manifest cause, seized with a disease which in a very short time proved fatal. The only symptoms at first were a slight rigor and breaking out into a sweat, with, some moments afterwards, slabbering and foaming at the mouth. Subsequently the pulse became all but imperceptible, sinking under the fingers; the membranes colourless; extremities cold; death at the expiration of some minutes. A large quantity of blood found effused into the abdomen. A considerable tumour occupied the sublumbar region, continuous in substance with the right horn of the uterus. This tumour, twenty-four pounds in weight, was of an oblong shape, and exhibited at the anterior part a rupture occupied by a clot of blood, from which had proceeded the hæmorrhage, the cause of death. Its tissue, white and homogeneous, was softened in the centre, where was found a small quantity of encephaloid matter. Its parietes, generally fibrous, varied in density, and in some places had the consistence of cartilage.

4. A mare, aged, had a chronic enlargement of the right hind leg, which after some months disappeared spontaneously; but the belly, which was also large, still remained so, and without any announcements of foaling being near. For some years she did her work excellently well, when all on a sudden she was seized with violent colics, from which she died in less than six hours. An encysted tumour of the left ovary occupied a great part of the cavity of the abdomen, where it had contracted adhesions with the omentum. This tumour, weighing forty-six pounds, slightly flattened above and below, presented a bright red surface and rounded borders, and contained some clots of blood, and a large quantity of granulous, inodorous liquid, of the colour of wine-lees. Its parietes, which were mostly fibro-cartilaginous, were in some places osseous. A false membrane, two or three lines in thickness, lined its cavity, which was covered with a red matter, looking like the sediment of the liquid within. The right ovary was triple its ordinary volume.

5. Violent colics seized during the night an aged mare, who died the following morning. The left ovary had become changed into an encysted tumour, weighing 28 lbs. with its capsule, and was ruptured to the extent of about eight centimetres. Considerable hæmorrhage had taken place into the abdominal cavity. The contents of the tumour were a greyish odourless matter.

6. A mare, nine years of age, suddenly attacked with sharp colic, died in the space of a few hours. The abdominal viscera were found bathed in blood, and the right ovary converted into an encysted tumour of the weight of 24 lbs. The fibrous covering of the tumour, thickened in places, presented a rupture through which the blood had escaped.

7. A mare, eleven years old, had been ill for some hours, manifesting all the signs of slight enteritis—pawing and looking at her belly, and lying down—with a pulse hard and but little accelerated, and much fuller than it ordinarily is in abdominal affections, and a troublesome tenesmus, which caused violent straining and the discharge of a considerable quantity of mucous matters. In spite of all treatment the colic continued for two days, and then all the symptoms subsided as it were by an act of enchantment. Evacuations returned, the spirits returned, and the appetite returned. But in two days more the complaint returned, and with increased violence, which nothing could subdue until terminated by death on the 6th day afterwards. The right ovary, formed into a cyst, had contracted an extensive though lax adhesion with the arch of the colon, with the functions of which, in its usual situation, it must in consequence have interfered, had it not in some unaccountable manner changed its position and got above instead of below the gut, and from the right to the left side, where it had embraced and drawn it down upon the pubes, and caused an internal strangulation of the intestine, in whose cavity were found masses of dried dung. Within the tumour was a large quantity of limpid inodorous fluid; and embedded in its coats were several serous cysts and some melanotic tumours.

A case of a female ass is reported by M. Lapoussée. Ever since she had foaled, she had at times emitted blood from the vulva; but as this did not appear to injure her, little notice was taken of it. After four months she was seized with violent colic, while suffering from which she emitted blood in rapid jets, black and partly coagulated. The vagina was red and very hot; the abdomen somewhat distended; the pulse small; extremities cold; and weakness to that degree that the animal could hardly stand. The next morning the hæmorrhage returned, and on the fourth day from that the ass died. The mucous membranes of the vagina and nose were violet-coloured; that of the uterus presenting general traces of inflammation, with some gangrenous spots, particularly within the left horn. The ovary, much enlarged, contained a mass of black fœtid blood, which, during life, must have passed into the womb through the Fallopian tube, whose caliber was double that natural to it.

In the *Recueil de Médecine Vétérinaire*, we read of the post-mortem examination of a mare in whom was found a tumour weighing 32 lbs. growing from the left horn of the uterus, and consisting of a degenerated ovary. It presented all the anatomical characters of scirrhus, with an appearance of cancer in some places, but in more of clots of blood. A cyst formed in one of the sides of the tumour enclosed a saline substance, mingled with hair,

which we looked upon as the *debris* of a fœtus that had become developed in an ovarian vesicle.

These highly interesting and valuable observations, remarks D'Arboval, with the accounts of the symptoms during life, may not suffice to enable us to trace unerringly the history of diseases of the ovary; but they will serve to erect a standard upon, around which other facts may be ranged, which, collectively, will one day fill up this hiatus in hippo-pathology. We at least learn from them, that these diseases may exist either in an acute or a chronic form; that those of the first class give rise to much the same symptoms as denote peritonitis and metritis; that the others are not indicated by any appreciable symptoms, but lay the foundation for tumours of considerable volume, which may exist without disturbance of function; and that the acute affections are likely to end in resolution, though they may terminate in suppuration, or run into the chronic stage, after which any of those organic alterations may ensue which take place in other parts; and, lastly, that when the tumour bursts and discharges its contents into the abdomen, death is inevitable.

CASTRATION.

BRITISH custom has so universally established the practice of castration, that, with the exception of the comparatively small number of horses kept for the purposes of racing and covering, every male horse in our own country may be said to be a gelding*. With us, the colt is emasculated at a very early period of his life, before the testicles have acquired any glandular or secretory powers, and consequently before any of those remarkable phenomena which it is well known attend on the production of semen have had opportunity of developing themselves. A com-

* In France, such colts as are destined for draught, as well as for covering, are left entire: those only are cut which are designed for the saddle. The spaying of mares is prohibited by law—has been since the year 1717—in consequence of its having proved the cause of many deaths.—*Hurtrel D'Arboval*.

parison of the stone-horse with the gelding cannot fail to demonstrate that the former is an animal in many respects of very superior pretensions to the latter : his physical powers, particularly about the neck and quarters, are more conspicuous ; his coat is of finer texture ; his gracefulness of form and carriage and action is, in a manner, lost in emasculation ; he possesses, in the eunuch state, no longer the energy natural to him as a stallion, but degenerates into a comparatively mild, quiet, tractable animal, reduced in stamina and constitution, and, as a consequence, rendered more liable to disease. Thus it is we obtain by castration the object we have in view, viz. more complete dominion over the horse and manageableness of him. But, in accomplishing this, what do we lose ?—a great deal compared to the little we gain, and so much, that it might fairly become a national question, why we, the same as foreign nations, cannot, for certain purposes and in certain situations, contrive to manage and work stone-horses.

To reduce the stone-horse, in point of nature, down to the gelding, it is not absolutely necessary to *extract* the testicles : any operation that will disorganize or destroy the gland, or that will intercept the conduit of semen from it, will be attended with the same effects, in the course of time, as so speedily follow actual castration. A knowledge of this fact it is that has led to the practices of bruising the testicles, excising the epidydimis or portions of the spermatic duct, &c. The objections to these alternatives for castration are, that many of them create quite as much pain and irritation and evil effect as gelding itself does—some even more ; and that none of them so speedily and completely accomplish the object we have in view as the absolute removal of the testicles.

CONCERNING THE BEST AGE FOR CASTRATION, there is some difference of opinion, arising, in a great measure, from viewing the subject through different media. The man who confines his views to the simplicity and safety of the operation, rightly argues, the earlier it is performed the better. Mr. Brettargh, V.S., Preston, in a letter to me, says, "Every spring since I left you at the College I have operated on foals at all ages, from ten days to four months old, and am convinced of that being the most eligible period."—"Colts grow larger than when castrated later."—"Colts

are foaled with their testicles within the scrotum, which remain there, in ordinary cases, until the fifth or sixth month, when they are taken up between the internal and external abdominal rings, and there they remain until the eleventh, twelfth, or thirteenth month, all depending upon the degree of keep, as in some that are particularly well fed the testicles can at all times be found within the scrotum." This does not quite accord with the account D'Arboval gives: he tells us, "the horse cannot be castrated prior to the fourth or fifth month of his age, the testicles not appearing until then within the scrotum." I am not, myself, in a situation to resolve these apparently discrepant statements: extensive opportunities of observation in large breeding establishments can alone set us right in this, as it would appear as yet—not very much to our credit—unascertained fact. In respect to the age of puberty in horses, we in general do not notice any manifestation of venereal desires prior to the second year; about this period they seem to become engendered: unless, therefore, it be intended that the colt should experience the effects of this change, I see no good reason for not operating at the earliest possible age: on the other hand, should there be a desire that the growing animal should partake, either in his bodily frame, constitution, or temper, of the nature of the stallion, then considerable protraction of the operation beyond the period of puberty, or time when he first begins to notice mares, will become necessary to attain the object in view. I cannot myself discover any advantage or use in pursuing a middle course: it appears to me all nonsense to say this or that age is to be preferred, without having reference either to the operation itself, or to the influence of the testicles on the animal structure and economy. D'Arboval informs us that the horse will bear the operation so late as his twentieth year.

THE METHODS OF CASTRATION practised at the present day may be said to comprise four very different operations—by cauterization, by compression or caustic, or by both together; by ligature; by torsion: the barbarous operation of *tearing out* the testicles with the hand, which was once practised upon horses and still continues in use for small animals, having been, at least as far as the horse is concerned, very properly abandoned. The

late Professor Coleman used to relate the case of an old stallion, in which this process of laceration or tearing-out was executed with success: first, one testicle was torn out without any consequent alarming hæmorrhage; then, after the lapse of a few days, its fellow was extracted. Had both spermatic cords been ruptured at the same operation, dangerous bleeding would probably have ensued.

IN REGARD TO SEASON AND WEATHER.—The operator should—where he can—object to castrate either during very cold or very sultry weather, or while the horse is shedding his coat, or in the season when, or situation where, flies prevail. These precautions will especially demand attention when our subject is an aged horse, or one that has been highly groomed or fed. The time to be preferred is late in the spring, after the horse has shed his coat, and before the flies have made their appearance.

PREPARATION of some sort is in most cases required; and it is indispensable that the subject for operation be at the time in good health. Should he be a colt at grass, nothing beyond confining him in some place where he can get nothing to eat for the twelve hours preceding the operation will be necessary. More than this will, however, be requisite when we have to deal with a colt or stone-horse in the stable, and particularly in the case of an aged stallion or one in high condition: in his case mashing for some days, with a dose of physic or two, will be called for, or bloodletting may be advisable; attention being paid, as in the colt at grass, to keeping him fasting the night before operating, in order that he may in a measure unload his bowels.

A **PRECAUTION** more necessary than any one I have mentioned is pre-examination of the subject for hernia. Should the horse have raced or been in training, or even have hunted, rupture is not unlikely to exist, and would, of course, materially alter our views in regard to the operation. But a judicious veterinarian will submit *all* subjects to manual exploration prior to their being cast, young as well as old; though he will so rarely meet with hernia in the unbroke colt that in his case it may look like a supererogatory precaution: still it will turn out a satisfactory one, and as it constitutes but the act of a minute had better be observed.

FETTERING AND CASTING the subject for operation is an affair promptly and easily executed when performed with method and suitable apparatus. It commonly happens that the veterinarian has to cut a colt unbroke; perhaps one that has never been haltered. Supposing him, with others, to be driven up into the corner of a field or other place, the first thing to accomplish is by coaxing or stratagem to slip upon or over his head a flat hempen halter, with which it is advisable, should he prove very refractory, to tie him up to some strong place for a time, to give him an opportunity of expending some of the rebellious spirit we have roused in him—by hanging back and tugging at the halter-rope—prior to our taking further liberties with him. In some cases, by way of a more effectual quietus, he may, by adding some lengths to the halter-rope, be lunged for a while upon a dunghheap or ploughed field. As soon as he is rendered tranquil or rather sullen enough to admit of approach to him, an attempt may be made to put a twitch upon his nose, or, that failing, upon his ear: not that this is in all cases necessary, or even prudential; some colts proving more manageable without this painful expedient. In other cases, blinds prove excellent means of intimidation, and of the greatest service. Having led or pushed him to the place upon which we intend to cast him, providing we can manage to fix hobbles around his legs, he may be thrown and secured in the ordinary manner, care being taken that he falls, or is afterwards turned, upon his off side; which being done, the near hind leg is to be drawn up, either with a broad web or a hobble and side-line, against the shoulder, and as close to it as possible, and confined in that extended position by passing the web or rope around the neck, and from thence a second time, by means of a half-hitch, around the heel, or else through the ring of the hobble: the remainder of the web or rope being made fast by a knot, or, what is better, when people are at hand, firmly held by one or two men. One man will be sufficient to maintain the extension of the other three legs: making the hobble-rope fast to any place, though often done where assistance is scarce, is not unattended with danger. In every case a man will be required to take charge of the head, in order, the moment the colt falls, to cushion his knee forcibly in the hollow behind the ear

upon the side of the neck, in such manner as to be able to keep the head pressed down, while with his hands, by protruding the muzzle, he prevents the animal from incurvating his neck and getting his nose towards his chest. It may so happen that hobbles are not provided, or that the colt turns out so wild and unruly that they cannot be put on: in such a case as this what is to be done? A rope about thirty yards in length and two or three inches in diameter, will serve as an excellent substitute: a cart-rope will answer, and one can generally be procured. Let this be equally doubled, and formed at the folded end by a knot into a loop sufficiently large to admit the head and neck, and hang upon the shoulders the same as a harness-collar, with the knot turned downwards. The two ends of the rope coming from the knot in front of the breast, are now to be carried backward between the fore legs, and brought around the hollows of the heels of the hind legs, forward again, on the outer sides, to be run through the collar-rope, from which being carried again backwards, and extended in a direct line behind the animal, they are ready to serve on the application of force as a double-pulley, operating in drawing the hind feet close against the elbows: thus at once casting the animal, and securing him, when down, in a position highly advantageous to the operator. One man will be required—two answer better—for each rope, who should be stationed directly behind the colt, and as near as they can approach to his quarters, it being impossible now for him to kick. Just before the pull is made, it is a good preparation to falling, if we dare venture to do it, to advance his hind feet by lifting them forwards under his body; and when the time comes to make the pull, the men ought to exert themselves all at once, and no less forcibly and simultaneously than suddenly, it being desirable to take the animal off his legs by surprise—before he receives that warning of what is about to be done to him that sets him struggling and resisting. The moment he is thrown, the man at his head must with his knee confine him down in the manner beforementioned, while the pullers are still continuing to draw the hind legs forward. The hind feet being drawn close to the elbows, the force must be steadily maintained until each rope by half-hitches be made twice more to encircle the fetlock: one

rope may then be carried backward, the other forward, each being firmly held by an assistant in a state of extension. The colt thus secured may be turned upon his back and bolstered up by bundles of straw, or be kept reclining upon his side, at the pleasure of the operator, who, while he is maintained thus secured, will in any situation find himself in perfect safety.

CLEANSING AND LUBRICATING THE GENITALS is a preparative adopted by most gelders and farriers. In respect to it may be observed, that, to drawing the penis and sponging it and the sheath clean with tepid water, and wiping them dry with a linen cloth, and afterwards smearing them both with lard, there cannot be any objection; nor, unless the parts really be foul, will, I think, any material advantage be found to result from it.

CASTRATION BY CAUTERIZATION is that which is generally practised in our own country; though one which the veterinarians of France, D'Arboval informs us, have abandoned for these sixty years past: the operation there, being in the hands of gelders only, whose knowledge is traditional. It is by us performed as follows:—The instruments, &c. required are, a sharp scalpel of large size, a pair of steel clams slightly curved, two budding or common firing-irons—the latter having straight edges—to be made red-hot, a sponge, and pailful of water. The operation is commenced by imprisoning between both hands the testicle lying uppermost, and grasping and holding it fast with the right hand, while the left is slid round in front of it to obtain firm hold of the cord above the epididymis, which enables the operator to carry the testicle backward and upward, and by so doing to render the skin over it smooth and tense. The *raphe* must be his guide in regard to the skin being drawn into its proper situation, as well as for his first incision, which is to be made in a line parallel with it, and at the distance of about a finger's breadth from the side of it. Should the action of the cremaster oppose his getting complete possession of the testicle, a sudden thwack upon the body or shake of the head will generally occasion a momentary relaxation, of which the operator must not fail to take advantage. With the scalpel in his right hand, now at liberty, the operator draws a fine incision along the inferior border or long axis of the testicle, sufficiently deep only

to divide the skin—which is here remarkably thin—but of sufficient extent to reach from one extremity of the stone to the other. This he follows up by dividing with a light hand, in like manner, the cellular and fibrous substance underneath; and lastly, by cutting through, in a more cautious way still, so as not to wound the testicle uprising all the while against the knife, its immediate covering, the tunica vaginalis. Some persons use the actual cautery, instead of the knife, for the section of the envelopes, assigning as their reason for so doing, that not only is all hæmorrhage, which is likely to annoy them, thereby suppressed, but subsequent union by the first intention effectually destroyed. The French employ a bistoury for the same purpose; a practice, I think, as far as the vaginal tunic is concerned, which may be worthy our imitation, from its guarding against all possibility of wounding the substance of the testicle. No sooner is its vaginal tunic sufficiently divided than the testicle starts from its case, humid and shining, and arborescently and beautifully venous: an event almost constantly announced by a violent struggle, during which the cremaster exerts such astonishing power, that, unless we quickly seize the spermatic cord with our left hand and firmly maintain our hold the testicle will be sure to escape and slip into its canal. Should one stone be a very small one—which is now and then the case—it may even be drawn up through the ring, and occasion the operator considerable difficulty in finding it again, as well as delay in the operation. The subsidence of the struggle will be attended by relaxation of the cremaster, and the effect of this will be, to allow of the elongation of the cord, and consequent complete possession and controul of the testicle. This is the time to put on the clams. Before closing them however for compression, it is good practice to divide the vas deferens with the scalpel and liberate that from their grasp; by which not only will the animal be spared unnecessary pain, but the operator be enabled more effectually to compress the blood-vessels. Also, before the clams are finally closed and locked, the operator must determine on the place of section, for cauterization of the cord. For this no invariable rule can be given: if left too long, it may hang out of the wound afterwards, prevent union, and grow into *champignon*; if cut too short, and there should happen

to be any secondary hæmorrhage, it will be a difficult affair indeed to recover it again. The natural length of the cord, which is not the same in all subjects, but which may be estimated the moment relaxation has taken place, must be our guide. Having in our eye marked the place of division, the clams are to be closed and compressed sufficiently to arrest the circulation of the blood, and, at the same time, retain the cord between them without risk of its slipping after the testicle is off: they may be locked or not as happens best to suit the operator. The firing-iron being handed to him, the operator is to commence his cauterization through the posterior part of the cord, in the situation of the spermatic artery, at the distance of about three-fourths of an inch from the surface of the clams; dividing the artery, first with the edge of the cautery, and then searing its mouth with one corner of the thick side or *heel* of the firing-iron, while at its greatest heat*. The spermatic artery being once seared up, the remainder of the cord will simply require cutting through with the edge of the iron. Another mode of procedure—more surgical than this and one that is growing in estimation—is the division of the cord with the knife, and the subsequent application of a heated budding-iron to the mouth of the spermatic artery, leaving untouched with the cautery every other part. It is imagined, by not cauterizing the vaginal tunics we run less risk of peritoneal or dangerous inflammation afterwards†. The testicle removed and the hæmorrhage stanchèd, the clams may be dilated in that slow and cautious manner that affords no risk of the end of the cord escaping, and yet sufficiently removes compression for the purpose of ascertaining if the mouth of the artery be really seared up: should it not, a fresh heated iron had better be applied upon

* This is the practice of the French gelders. They divide the cord with a bistoury, and then—instead of a firing-iron—apply a budding-iron to the mouths of the bleeding vessels only, but at a white-heat, so as to *carbonize* them: it appearing a matter of consequence, says D'Arboval, not to cauterize the tunica vaginalis.

† If the iron be not at a white heat it adheres to the eschar, and detaches it, so that the blood continues to flow; and even when it is applied at the proper heat, if it be allowed to remain too long, the same effect will follow.—*Costello's Paper on Torsion.*

it. In some cases the artery, cringed by repeated cauterizations, becomes so sunk and embedded in the surrounding substance that the cautery cannot fairly sear its orifice: when this happens, it is best to cut with the iron or knife another slice off the cord, whereby a fresh surface will be obtained for renewed cauterization. As soon as all bleeding has ceased, before liberating the end of the cord from the clamps, it is usual to sprinkle its surface with some powdered resin, and to melt this with the cautery so as to give it a sort of coating of cement, the more effectually to seal up the mouths of the bloodvessels. I very much doubt, however, that it can have upon the already constricted vessel any useful effect, and, moreover, there is the objection to its use of its afterwards proving an additional source of irritation. Done or not done, as pleases the operator, he is now gradually and cautiously to dilate the clamps, and allow of the escape of the cord into the scrotum. By a similar procedure the other testicle is to be extracted. In the event of either of the cords bleeding anew after being released, bowlsful or bucketsful of very cold water may be dashed upon the parts, and the animal kept quite quiet for some minutes: should it continue in spite of this, and appear to be arterial, it will be advisable—particularly in the case of an adult or aged horse—to recover the end of the cord and submit it afresh to cauterization.

THE OBJECTIONS URGED AGAINST CAUTERIZATION are,—1st, That it produces violent inflammation and its consequences; 2dly, That there is risk of secondary hæmorrhage at the period of separation of the eschar. The best replies to which objections are, that cauterization can be shewn to be—in colts at least—as generally successful as any other of the methods of operating in practice; and that, as for fatal secondary hæmorrhage, it is never heard of.

THE AFTER-TREATMENT to be pursued must very much depend upon circumstances. Supposing the colt to be at grass at the time of being castrated, and the weather to be neither cold nor wet, and there be no flies abroad, he may be turned out again after the operation: nothing farther in general being required than cleansing the parts now and then from the discharges, taking care that the wounds are kept from healing by the first intention by the introduction of the finger into them, should it be required, on the second

or third day afterwards; else, when suppuration comes on, should the matter be pent up, abscess and a good deal of swelling will be the consequences. For a horse standing in a stable at the time of being cut, a loose box is the best situation afterwards even in this case, however, if the weather prove fine, and there be a small paddock adjoining, letting him take exercise at pleasure from the day after the operation, will prove beneficial. For, with the view of promoting suppuration and discharge from the parts, and of abating swelling, exercise is found to be very beneficial; of which no horse will take sufficient of himself in a box, while in a stall he can take none: it is therefore a good practice in general to have our patient led out in hand at a lounging walk twice in the course of the day. A mash diet should be enforced. And some simple enemata, which are safer than aperient medicine, should the bowels require them, may be exhibited. Attention being paid, as in the case of the colt, to the holes in the scrotum, and to cleanliness.

CASTRATION BY COMPRESSION was first introduced to the notice of veterinarians of this country by Mr. W. Goodwin, through a paper he read on the subject to the Veterinary Medical Society in 1828, which was afterwards published in *The Veterinarian*. It appears to be the most ancient of any of the different modes of operating; and is, according to D'Arboval, at the present time almost the only one in vogue in France. The rationale of it consists in devising means to squeeze the spermatic cord to that degree that all communication, vascular and nervous, is intercepted between the testicle below and the cord above the part compressed; the consequence of which, of course, is, the destruction of the vitality of the testicle, and, finally, its spontaneous separation from the body by sloughing. The pressure may be made upon the cord either while covered by the tunica vaginalis, or after it has been uncovered. The instruments necessary for its performance are, a *scalpel* or *bistoury*; *two pairs of clams*, each pair fastened at one end; strong waxed *ligatures* to secure the other ends; and *a pair of pincers* for closing and holding the clams. The common clams are nothing more than sections of old and seasoned elder-wood; but some have since been manufactured of box and lance-

wood, which appear more conveniently shaped. The grooves in them are to be filled with a caustic paste: one composed of the bichloride of mercury or sulphate of copper, and flour and water, appears best suited for the purpose. I have on several occasions omitted using any caustic, imagining it could not exert any—or any beneficial—effect under the unremitting pressure of the clams; but I found I had not produced the same deadening results on these occasions, and therefore I now always employ caustic. I once introduced—so long ago as 1821—*potassa fusa* into the clams; but this proved too active—the testicles after a few hours dropping off into my hands; and besides, it proved objectionable on account of its propensity to liquefy and spread. Although no more than two pairs of clams are required, it is as well to have a third pair ready, in case of accident.

We will suppose the horse to have been prepared for the operation in the manner already prescribed for that of cauterization, and to be cast and secured upon his near side likewise as afore-directed, and the operator to be ready with his instruments and apparatus, which had better be spread upon a board or tray, and handed to him by his assistant. The incipient steps of the operation are also the same as those for cauterization, save that the left or *undermost** testicle is to be first operated on. After dividing the scrotum, whether he proceeds or not to incise the tunica vaginalis and lay bare the testicle, will depend upon which operation he is going to perform, the *covered* or the *uncovered*: supposing it is to be the latter—the one commonly practised—the vaginal tunic is to be cut or slit open the same as for the former operation. The operator now grasps the testicle, and by drawing it out, maintains that extension of the cord which is requisite to enable his assistant to place the clams upon it, which he then takes in his own left hand,

* In the operations by cauterization, ligature, and torsion, it is desirable to remove the testicle lying *uppermost* first, in order that it may be out of the operator's way when he comes to extract the other stone: but should he be going to use the pressure-clams, he will find it very inconvenient unless he operate first upon the testicle *undermost*.

and adjusts as high up or close to the belly as he possibly can: it being most desirable to fix them completely above the epididymis; since, should any portion of that body be included, not only will much additional pain result, but it will be very likely to be followed by champignon. Care must also be taken, by keeping the cord spread out, that every part is duly subjected to pressure at the time that the assistant squeezes their ends together with the clamping-pincers*. This done, the operator himself takes the pincers in his right hand—leaving now his hold of the testicle—and maintains them closed (locked, if he likes), while his assistant secures the clams with a waxed ligature. The other, or uppermost testicle and cord, are dealt with after the same manner, and the operation is concluded. The common gelders in France are in the habit of taking off the testicles at the time of putting on the clams, leaving only sufficient of the epididymes to prevent the cord from slipping through the clams; while those who practise this mode of cutting in our own country, leave the testicles on until the time arrives to remove the clams, which some do at the expiration of twenty-four, others of forty-eight hours; but D'Arboval recommends that the clams continue on until the testicles spontaneously slough away, which they will do about the fifth day afterwards. The removal of the testicles at the time of the operation†, or within one day afterwards, sometimes after even two have elapsed, is commonly followed by hæmorrhage, which, though it may be no-wise dangerous, is liable to prove troublesome. Another objection to the early abscission of the testes is, that the cremaster, losing the counterpoise of their dependence, draws the clams up so violently against the belly that irritation and swelling are likely to be the consequence. I have known this to happen while the testicles have been hanging on, and I have been obliged on this account to cut them away, with the clams, twenty-four hours before the prescribed

* The vas deferens is not to be divided, as is recommended to be done in the operation by cauterization. Of itself, the vascular portion of the cord is incapable of supporting the weight of the pendent testicles.

† Should the stones be cut off, the epididymes will be required to be left to serve as a stay against the too forcible contractions of the cremaster.

time. The only thing that can be urged, I think, against their remaining on until they come away of themselves, is the protraction of a spectacle of which, from its being disagreeable to common observers, we are perhaps desirous in general to abridge the term of duration.

THE "COVERED" OPERATION has always appeared to me to be more difficult of performance than the "uncovered" one: there is more trouble in getting on the clams, and a great deal more force required to close them; in consequence of which, I should imagine, the pain must be a great deal more; and from this, we are told, tetanus has resulted. In a case where hernia was either present or suspected, certainly the covered mode should have the preference: added to which, its advocates tell us, it possesses the advantage of not exposing the abdominal cavity to the influx of air.

AFTER THE OPERATION, if the weather be fine, and particularly while our patient is manifesting much uneasiness, walking exercise in hand for an hour will prove of service to him; and when he is returned to his stable or box, let him be secured to the rack with one or two strong halter-ropes, so that he can nowise get his head to his flank and tear himself. Should he have a long tail, it had better be plaited and doubled up, to prevent him switching his genitals. In respect to exercise, according to D'Arboval, no harm can arise from continuing it for some hours, weather permitting, immediately after the operation, and it ought to be repeated daily until suppuration is completely established, and afterwards too, with the precautions that at this period it be more limited and confined to the finest part of the day. Should there be more than ordinary tumefaction, fomentation and aperient medicine may be required. In a case where much constitutional irritation prevails, we may bleed as well: nothing will sooner allay any cause we may have for alarm than a large abstraction of blood. While every thing is going on well, nothing farther will be required than exercise, and keeping the parts clean by fomentation, and, perhaps, an occasional enema. In fine, he will require watching up to the 10th or 12th day, after which he may be regarded as out of danger.

THE REMOVAL OF THE CLAMS, unless tumefaction of the parts demand it earlier, had better be deferred until the second or third

day, by which time the testicles, should they not have been separated before, will be quite dead, and the cords when cut through resemble so much dried bladder: if the clams be removed before the cords and testicles begin to assume the dried shrivelled aspect, which is evidence of their complete mortification, secondary hæmorrhage will ensue: in fact, the condition of the testicles must be our guide; in some cases twenty-four or forty-eight hours being sufficient, in others—from the compression probably being incomplete—double that time being required. In all cases they will require to remain on much longer after the covered than after the uncovered operation. In taking them off, there is a knack of procedure which it may be as well to follow. The horse being twitched, and his fore leg held up, the operator places himself against the near quarter of the patient, and with his left hand grasps the tail, upon which he balances himself while he stoops to carry his right hand, with a knife in it, between the animal's thighs, to rest his thumb upon the posterior ends of the clams, while with the knife clenched between his fingers he cuts through the ligature holding them together. This done, the knife is laid down and the clams diverged with one or both hands; for sometimes, in consequence of their being clogged with adhesive matters that have run from the wound, there is some difficulty in separating them. Afterwards, the parts had better be bathed with warm water, if it merely be with the view of cleansing them.

CASTRATION BY LIGATURE has for many years been abandoned by the generality of practitioners: the late Professor Coleman was in the habit of decrying it, on the score of its being occasionally followed by disastrous consequences; an opinion which subsequent experience appears to have strengthened, though there still exist practitioners who give the ligature the preference. The reason given, why an operation so well adapted for man that no other is ever thought of, should not be found to answer for horses, must be the anatomical one of there existing an open communication between the cavities of the scrotum and abdomen in the horse, but not in man: in the one instance, inflammation may be set up in the cord with comparative safety to what it can in the other; there being danger of peritonitis so long as the communication

remains open, but none after it is shut. That operation, therefore, which either admits of the scrotal wound closing at once, or else excites such a degree of inflammation in the first instance as glues up the abdominal ring, appears better adapted for the horse than one which, like that of ligature, is tardy in bringing on inflammation, and, after all, does so too feebly to produce the adhesive action necessary to shut up the cavity of the abdomen while the suppurative action is going on.

THE MODE OF OPERATING BY LIGATURE is quite simple. The scrotum and coverings of the testicle may be divided with a scalpel, in the manner afore described. The testicle being denuded, is to be given to an assistant, who must make a full and firm grasp of it, in order to counteract the contractions of the cremaster, and strongly maintain his hold until the operator has divided the vas deferens, which will render his task comparatively easy. The operator will now with forceps and the point of his knife, or with scissors, expose the artery, which he will find serpentine along the posterior part of the cord. A ligature of strong silk is then introduced underneath it by means of an aneurismal needle or eyed silver probe, which having tied, he severs with his scalpel the cord below it, and the operation is ended. One end of the ligature may be cut off close to the knot, the other is to be left hanging out of the wound, until the second or third day, after which it may be removed.

Mr. Thomson, V.S., Beith, in a letter to Mr. Dick, published in *The Veterinarian* for 1835, writes—"I have made many experiments as to the use of the ligature in the castration of colts and horses, and the removal of this ligature on the 2d or 3d day. However humane the plan may appear, there are serious objections to it. Suppuration, in the generality of cases, does not commence until the 5th day—rarely sooner, sometimes later. Inflammation of the scrotal portion of the peritoneum must extend more or less during that period, and its progress is not arrested until suppuration commences."—"I have cut about ten colts; some did remarkably well, in others the swelling was very great before suppuration commenced. In one that died it was uncommonly large. Suppuration did not commence until the 6th day. The animal got better at the time, the swelling subsided, but he died two months afterwards."—"I will geld no more upon this principle (ligature) unless particularly requested to do so."

CASTRATION BY TORSION remains to be considered: not in the barbarous manner in which, years ago, it used to be performed in this country and France, but in accordance with the new lights shed on the subject of torsion by Messrs. Amussat and Costello. It is known well enough that in young animals—even in the colt—the testicles may be torn out of the scrotum after being denuded, or be detached by twisting round the cord until it breaks, and yet no dangerous hæmorrhage ensue. As has been stated, Professor Coleman saw the stones of an aged stallion torn out: one testicle was extracted without much hæmorrhage, and, after the lapse of a few days, the other: had both been torn out at one time the animal might—and would most probably—have bled to death. The operation of twisting the cord is performed by first laying the parts bare, and then taking firm hold of the upper part of the cord with the left hand, while the right is engaged in twisting off the testicle, by repeatedly turning it between the finger and thumb. And this operation, coarse and unscientific as it is, does not appear to be a very painful one, nor in young animals to be succeeded by any alarming hæmorrhage.

COSTELLO'S—or rather AMUSSAT'S—improvement upon this consists in twisting the bloodvessels, the arteries, only. From reflecting upon the facts that contused and lacerated bloodvessels seldom emit blood, M. Amussat instituted some experiments, the object of which was to imitate these effects artificially; in the course of which, happening on one occasion to twist an artery, he was struck with the fact of its emitting no blood: thus accident led to a discovery which deductions from foregoing facts might have anticipated.—“ In practising torsion, Amussat seizes the divided vessel with a pair of forceps in such a manner as to hold and close the vessel within their teeth. The artery is then drawn from out of the tissues surrounding it, to the extent of a few lines, and freed with another forceps from its cellular envelope, so as to lay bare its external coat. The index-finger and thumb of the left hand are then applied above the forceps, in order to press back the blood contained in the vessel. He then begins to twist the artery. One of the methods consists in continuing the torsion until the part held in the forceps is detached. When, however, the operator does not

intend to produce this effect, he ceases after from four to six revolutions of the vessel on its axis for the small arteries, and from eight to twelve for the large ones. The hæmorrhage instantly stops.”—“It is of the utmost importance to seize the artery perfectly, and to make the stated number of twists; otherwise the security against the danger of consecutive hæmorrhage will not be so perfect.” M. Amussat is so satisfied with torsion, that he now employs no other hæmostatic agent: he has found it successful in castration, amputations of the thigh and arm, and in disarticulation of the shoulder-joint. The effects of torsion upon the vessel are—the internal membrane is broken and becomes rolled up in the form of a *cul-de-sac*, containing in its middle a clot of blood, to which it afterwards adheres through the effusion of plastic lymph. In no instance has the artery been observed to ulcerate or become gangrenous.

To Mr. MOLYNEUX, V.S., London, belongs the credit of being the first to introduce torsion in the castration of horses. In *The Veterinarian* for 1835, appears the following:—

In November 1834, Mr. Molyneux was requested by Mr. Geale, job-master, Regent-street, to castrate a colt. Torsion was suggested and consented to. The colt was cast and secured in the usual mode. Mr. M. laid bare the testicle in the ordinary manner; next divided the vas deferens and cellular membrane, immediately above the epididymis, leaving nothing attached to the testicle but the spermatic artery and vein. “I then took the torsion-forceps and applied them as tight as possible, after the clams had been placed on the cord about three inches from the epididymis in the usual manner, and the testicle was cut off. The forceps were turned eight or nine times, and held firmly for four or five minutes, when the cord was suffered to return gradually into the abdomen. I waited five minutes, and no hæmorrhage ensuing, I operated in the same manner on the left testicle. The colt was then let up, and only the trifling quantity of blood which is usually discharged by the scrotal vessels was lost.” Annexed to this—the first case—are accounts of two others, one of the horses being five and a half years old, equally successful in their result.

BY WAY OF CAUTION, Mr. Molyneux adds, that the operator should make the requisite number of torsions steadily and without stopping, and “hold the cord firmly two or three minutes afterwards.” According to Amussat and Costello, however, this last injunction is unnecessary. “If after a certain number of turns the operator pauses, and then, fearing he may not have done enough,

gives another turn, and, after that, perhaps another, the coagulum or clot is disturbed or broken, and hæmorrhage will possibly follow." In the short lapse of time in which Amussat and Costello, continuously, seize, twist, and replace the vessel, it is impossible coagulation of its blood can take place.

Mr. RICHARDSON is the next to adventure in this bold but commendable line of practice. Confessing himself "among the number who entertained doubts respecting the efficacy of torsion in the horse;" he, now that he has tested it, "does not hesitate to express his firm conviction that this will be the only method, in after days, resorted to by veterinarians for the removal of the testicles."

Mr. Richardson made his first essay on an ass. The result exceeded his most sanguine expectations. He afterwards operated on three colts; and "never saw colts do so well as they did afterwards." Being at grass, the colts were in the morning taken into the creyard, and kept without food until the afternoon. They were then cut, and "immediately allowed to go at large again in the fields."—*Veterinarian for 1835*.

To Messrs. SIMONDS and DAWS are the profession indebted for most valuable and confirmatory information on the subject, published in *The Veterinarian* for 1840.

Mr. SIMONDS has drawn up a "report" of nine cases.—Case I, was a four-year old donkey. The testicle was let out with a scalpel, the finger passed between the vas deferens and vascular part of the cord, and the latter divided, which gave the operator full control over the cremaster. The spermatic artery was now laid bare, about an inch above the testicle, and was then seized with the torsion-forceps, and, lastly, divided immediately behind the forceps. The artery was drawn gently out, and about a dozen twists given to it. Then it was liberated. No blood escaped for a few seconds; but afterwards the jet was so considerable that Mr. S. was obliged to seize it anew, and make fresh twists. This effectually stanching the hæmorrhage, and the testicle was cut away. The other testicle was similarly extracted; and the animal let up. A quarter of an hour after Mr. S. found the right spermatic artery bleeding—arising from his not being *au fait* at manipulating his forceps. The ass was re-cast, and the vessel tied. Some swelling followed; but the ass did well.

Cases II, III, IV, and V, similarly operated on, all did well.

Case VI.—A four-year-old donkey bled after rising. But as the hæmorrhage appeared to come from the artery of the cord, nothing was done. It stopped, and he did well.

Case VII.—A thorough-bred yearling. Testicles small, and not completely down. The cord so short, that great difficulty was experienced in applying the forceps. With the left cord Mr. S. succeeded, and by a few turns prevented bleeding; but with the right he was compelled to have recourse to the actual cautery. This shews we cannot always succeed in applying torsion.

Case VIII.—A valuable chestnut horse, seven years old. The left cord was considerably enlarged, and serous effusion had taken place into its tissue. The artery, about two inches above the gland, was found to divide into three branches. By proceeding cautiously, these were in turns seized and twisted with the forceps. The artery of the cord gave out a fine stream; but as Mr. S. has seldom attended to this, the animal was let up without any attempt to arrest it. The bleeding continued for two hours, and the scrotum on that side was filled with coagulated blood, producing some pain, accompanied with an accelerated pulse and hurried breathing. An opiate was given. This shortly produced relief, and all went on well. The coagulum was removed on the following day, and the parts fomented. More swelling took place in this than in any preceding case; but it yielded to fomentation and exercise.

Case IX.—A two-year old, the property of the Queen Dowager. The left testicle was double the size of the other, and the artery of the cord was very large. Having had some reason to regret not having applied torsion to this vessel in Case VIII, in the present one Mr. S. twisted it. Very slight preputial swelling ensued, and the case was discharged the day after operating.

Mr. Daws, in 1838, by way of experiment, cut an aged stallion by torsion, who died the following morning from hæmorrhage of the right cord. On examination of the parts, the left spermatic artery was found perfectly plugged: the right had recoiled and untwisted itself. Its mouth was open and free from blood. The same year Mr. D. operated on another subject, more than twenty years of age, who had covered a short period before the operation. Being bought for the experiment, he was destroyed four days after the operation. Clots at the divided ends of the vessel had rendered them completely impervious. Their inner tunics were torn and adherent. There was a slight appearance of healthy purulent secretion on some spots. The following year Mr. D. operated on three colts. No constitutional excitement supervened, and tumefaction of the sheath resulted. Mr. D.'s words are—"These results exceeded my expectations."

In conclusion, let me mention, that Mr. Wardle, V.S., East Sheen, in 1838, operated by torsion on sixteen colts, all of whom have done well. His own conviction is, that he "shall never again use the actual cautery."

These accounts of *torsion* are flattering indeed. He must be at least a more than ordinary sceptic who will not, after perusing them, be induced to put the new remedy to the test, and judge for himself. There appears to be little or no apprehension entertainable about secondary hæmorrhage in colts; but that such may en-

sue, and prove fatal, in aged stone-horses, is sufficiently manifest from one of Mr. Daw's cases; and should such an event happen to a veterinary surgeon in private practice it might be enough to blast his reputation*, in addition to the disrepute into which it could not fail to bring the operation itself. In the army, cases of castration are so few that I have not yet myself† had an opportunity of practising torsion‡: when I have, I think I shall, by way of precaution, run, with a needle, single but strong threads through the cords, and leave them hanging for some distance out of the wounds, with a view of enabling me to recover the cord, should secondary hæmorrhage come on; otherwise, they might readily be withdrawn on the next day. Such a simple addition as this could not irritate, and yet might, it strikes me, prove of very great service.

ANORMAL APPEARANCES DURING CASTRATION now and then, not often, present themselves. Against them the castrator must be prepared to act at the moment of their occurrence, there being little time then for consideration, and no excuse for being—what he never ought to be—taken by surprise. The first unusual appearance—and very unusual, unless in aged stone-horses, I believe it to be—is, *adhesion between the vaginal and albuginous tunics*, the common situation for which is the infero-posterior part of the testicle. Should the adhesion be recent, the tunics will admit of separation either with the finger or the handle of the scalpel; an old and firm one may require cutting. This will but somewhat protract the operation—in nowise alter it. The worst accident likely to befall the operator is

HERNIA; and this, should he have done his duty in examining the animal beforehand, may generally be guarded against or not encountered. It is of little use in some of these unwelcome cases to represent the risk and danger attendant on castration: the

* “Among the numerous difficulties which the country veterinarian has to encounter, there are none that hurt his character or blast his reputation more than a case of unsuccessful gelding.” So, truly, writes Mr. Thomson, of Beith.

† Widely different, this, from the French service. M. Texier, V.S. in the French cavalry, says, “From the beginning of December 1830 to April 1831 I received for my regiment at Erreux about 2900 horses, 2000 of which were castrated, but by a gelder provided by the contractors.”

‡ Since this was written I have experimented on an ass with success.

owner perhaps will have it done, and the operation, of all others, especially adapted for the case, is the "covered" one, with pressure-clams. Should hernia unexpectedly come on during the operation, the pressure-clams must be resorted to as still the most effectual means of preventing protrusion; and in such a case, the longer they are kept on the better. In a case of actual protrusion of bowels, the introduction of one hand into the rectum, while the other is employed at the scrotum, will be found the readiest mode of returning them: intestines, should it be necessary from their inflated volume, being punctured in places; at the same time that any requisite dilatation is made at the abdominal ring, as in case of strangulated hernia, which in fact this has now become. Should a portion of omentum protrude, and be not easily returnable, it may be cut off*.

THE CONSEQUENCES OF CASTRATION are either *normal* or *anormal*. The former comprise *pain, inflammation, tumour, suppuration*: the latter, *hæmorrhage, hernia, peritonitis* and *enteritis, champignon* and *scirrhus, gangrene, tetanus* and *palsy, amaurosis, strangles, farcy* and *glanders*.

THE NORMAL OR NATURAL CONSEQUENCES are, expression of pain, more or less violent, which gradually subsides in the course of a few hours after the operation; and tumour of the parts, appearing about the second day, greatest in the anterior or most dependent portion of the sheath, and, according to D'Arboval, greater in colts than those older. Even though the swelling should be considerable, still so long as it is confined to this part and is evidently "dropping," it need excite no alarm. It is only when the tumour occupies the circumference of the wounds, acquires a globular and tense and shining aspect, extends underneath the belly, and occasions evident stiffness and dragging of the hind quarters, that it will become necessary to pay especial attention to it; not so much on account of its liability to augment outwardly, and occasion a sort of phymosis and difficulty of staling, as from its inwardly extending up the cord, and ending we know hardly where or in what. A full blood-letting is of all others the best reception we

* For further information on this subject turn back to the account of the operation for the "Hernia of Castration," at page 291.

can give this extension. Frequent walking exercise is also an excellent disperser of swelling. Fomentation may occupy the intervals. And copious enemata may supply the place of a cathartic; though, should that appear requisite, I would give it without hesitation. When tumour and tension is excessive, scarifications will give great relief: a reddish, filamentous, serous issue, D'Arboval says, is ominous of a tendency to peritonitis and gangrene, and this danger is much enhanced by the concomitant engorgement of one or both cords.—SUPPURATION, in reference to the operation by pressure-clamps, according to the same accurate observer, is announced by some fulness of the lips of the wounds, and accompanied by some febrile disorder, commencing on the second or third day, reaching its height on the fourth, and continuing until the suppurative process is completely established. At first a yellow serous issue is observed, which afterwards turns white, and at last assumes all the characters of pus. This laudable secretion, though its course may be interrupted by a variety of circumstances, continues augmenting up to the tenth or twelfth day, after which it slowly or quickly diminishes, sometimes not ceasing before the twenty-fourth or thirtieth day. So that often at the end of a month cicatrization is not complete, there still remaining some discharge.

THE ANORMAL OR INAUSPICIOUS CONSEQUENCES of castration include one which is hardly ever noticed, or perhaps thought of, viz. the admission of *air into the abdomen*: one very properly mentioned by D'Arboval as liable to occur in every operation save the "covered" one, and often, as he says, demonstrable by the gurgling in the sheath perceptible on inspiration and expiration. Its presence has never appeared to do harm.

HÆMORRHAGE, either unavoidable or from mismanagement, may occur after any of the operations: it rarely does, however, to excite apprehension; and when alarm has arisen, there are so many chances in favour of its stopping that we need be in no hurry about recasting the horse, or taking any desperate measures. Bleeding from but one spermatic artery—and it is not likely blood is flowing from both—though left without any measures whatever being taken to arrest the hæmorrhage, it is by no means certain that the horse

would bleed to death. Professor Coleman's experiment warrants this assertion. To be sure, his case was one of *arrachement*; but then it was that of an *old stallion*: a young one would have had a much better chance of surviving.

Lafosse could not conceive why people took so much pains about castration: he assures us he has cut many horses without either cautery or ligature, and they perfectly recovered; it is true, a good deal of hæmorrhage followed, but it was in no case mortal, at least that he heard of. Matheron excised both the testicles of a glandered horse: he bled copiously for four hours, when he fell from weakness, and sunk into a state of stupor, in which he lay six hours, and then recovered sufficiently to eat. On the fifth day after, he was destroyed, being in a fair way of recovery. Mathia performed the same experiment at Turin, in presence of Toffia, and the horse recovered. Excision of the testicles of a young vigorous horse, whose value was guaranteed, was also exhibited at the Alfort School, in the presence of the Professors Gilbert and Barruel, an account of which will be found in the Report of the Public Session held at the School on 12th Nov. 1815. In several countries in Europe castration is accomplished simply by laying open the scrotum and tearing out the testicles: the spermatic vessels are left unsecured and unsealed, and yet there is no dangerous hæmorrhage; but the acute pains which laceration of the nerves occasion ever produces so much inflammation and engorgement, that it would be better to cut than to tear the cord.—Barthelemy, desirous of setting the question beyond the pale of doubt, cut both spermatic cords just above the epididymes in five horses intended for dissection. One had risen a quarter of an hour before bleeding commenced. Another lost nearly a quart of blood. A third lost but a few ounces. It was observed the hæmorrhage continued longest in those that were weakest. Gohier has likewise made some similar experiments, not on horses only, but on other animals, from which he has drawn three conclusions:—1st, That the castration of solipedes by simple excision of the spermatic cords is not always a proceeding unattended with danger, some having lost within the space of a few hours as much as from two to four gallons of blood. 2dly, That such a procedure appeared less perilous in dogs. 3dly, That in small dogs, cats, young boars, lambs, and goats, the hæmorrhage amounted hardly to any thing.

If the improbability of the animal bleeding to death be great even when simple excision is practised and no means are taken to seal or secure the vessels, how much greater must this be when but partial hæmorrhage ensues from one or other of these styptic measures having failed! I never heard of a horse bleeding to

death after castration by cauterization ; and after the use of pressure-clams, providing the clams be not taken off, or the horse do not tear them off, before the testicles slough away, or they be not taken off in a manner to lacerate or unglue the sealed extremity of the cord, there can be none. In case there should be any small stream of hæmorrhage after the removal of the clams, it is in general very easy to catch the bleeding orifice with forceps or tenaculum, and pass a simple ligature around it ; or, if it be difficult to do this, or there be two or three places bleeding, the clams may be fastened on again. There is no difficulty so long as the end of the cord is visible ; it is when the bleeding cord has been shortened by excision or cauterization, or by the clams being torn off, and is afterwards drawn up into the vaginal sheath, that the case becomes embarrassing. In this predicament, the simplest remedy we can adopt is dashing buckets of ice-cold water upon the sheath ; the surest, getting hold of the end of the cord with a pair of long and bowed forceps, drawing it down, and putting a ligature around it, or applying the cautery to it : not being likely, however, to effect this, unless the horse be cast—which may or may not be advisable or convenient—should the cold affusion fail, we may try if we can plug the bleeding side of the scrotum with tow dipped in a solution of alum, and made up into hard pellets. Even this, however, according to D'Arboval, is objectionable, from the blood having been known to ascend and enter the abdomen : thus proving the cause of death in another way.

HERNIA rarely occurs *after* castration : indeed, when the pressure-clams have been employed it is almost impossible for it to happen. Should any bowel protrude, it will become necessary to cast the horse again, in order that it may be completely returned, and effectual measures be taken to insure its permanent reduction. Where no pressure-clams have been or can be used, the best—indeed the only—means of security we possess against a second protrusion, consist in stitching up the scrotum, for which the quill-suture will be found the strongest and most durable*.

PERITONITIS is a serious and sad consequence of the operation, which may shew itself at any period, even during convalescence,

* For further information on the subject of this hernia, turn to page 417.

and which, but too commonly, by rapid strides, in spite of all that can be done, ends in mortification and death. Inflammation unduly augmented or protracted in the scrotal wounds from some source of irritation, will readily find its way into the abdomen; though this probably is not so frequent a cause as catching cold or exposure to cold: turning a colt out after being operated on during cold damp weather, or into wet marshy pasture, and particularly at the fall of the year or in winter, is certainly subjecting him to an attack of peritonitis. It was observed at the Veterinary School at Lyons, during the sessional year 1817-18, that the inclement weather which prevailed proved the occasion of several horses being suddenly seized with peritonitis after castration, and of some dying from it, notwithstanding all that could be done. Dulness and dejection; loss of appetite; a tucked-up and tense abdomen; disturbance of respiration and pulse, ending in the manifestation of abdominal pain; will denote its attack, and set us about the employment of appropriate remedies.

ENTERITIS, according to D'Arboval, may prove a complication of peritonitis, and render the case so much the more dangerous: this is more likely to happen when the horse has not received the preparation of fasting for the operation, and has taken cold after it. It is indicated by the presence of the most violent griping pains. Should peritonitis not be already present, these fits of colic may bring it on. The symptoms and circumstances will declare the nature of the case, and it must be treated accordingly*.

CHAMPIGNON—for which we have not yet got an English name—occasionally arises after castration with the pressure-clams, but in no case, that I am aware of, has supervened upon cauterization: hence the little we as yet know about it in this country compared with the information which the experience of years has put French veterinarians into the possession of. D'Arboval's definition of it, is, a fungous enlargement of a scirrhus kind of the lower end of the spermatic cord; and the account he gives of it is as follows:—So long as the disease is confined to the extremity of the cord, it

* For which, and the further account of the symptoms, see "Peritonitis," and "Enteritis."

retains the appellation of *champignon* : when a sarcomatous change comes to affect the entire cord as high as, or even beyond, the abdominal ring, then it takes the name of *scirrhus of the cord*. Champignon oftener appears on the left than on the right side; not owing to any particularity of structure, but simply, apparently, to the greater difficulty of placing the clams upon the left cord, the right testicle being in the operator's way : one is apt not to get the clams so high up or so completely closed, and thus include a portion of the epididymis, which is the common cause of champignon. In some of these cases the swelling runs up the cord, even to the loins, and is a source of great pain. The cord contracts adhesions with the surrounding parts, and sometimes itself becomes a cancerous mass. Now and then, in the first instance, the scrotum partakes of the scirrhus tumefaction : but this gradually subsides—seldom any cicatrization or adhesion takes place : in general the aperture remains open and discharging, and the end of the cord, loose within it, continues ascending and descending according to the action of the cremaster. Champignons vary in their size and form : sometimes their largest part is below, sometimes above. From the commencement of this disease, commonly between the sixth and tenth day, the horse manifests stiffness in moving the limb of the affected side. This dragging of one or both hind legs is evident on his first leaving his stable : should it not diminish or disappear from exercise, but, on the contrary, continue or grow worse, we have good reason to suspect champignon ; for, as for the stiffness arising from the operation itself, that goes off with exercise. In proportion as the swelling of the cord augments, the difficulty of progression increases, both the croup and loins becoming affected in their movements : the horse also draws up his leg while standing, and becomes dull, and tucked up, and falls away. When the tumefaction of the cord is excessive, the animal halts upon the affected side : sometimes the limb becomes infiltrated all the way down ; and, should both cords be diseased, the movement of the hind parts is rendered quite painful, the patient no longer lying down, but continuing to be preyed upon by an exhausting suppuration and fever, which bring on marasm and death. The cord on dissection appears solid, thick, and scirrhus,

and as large as a man's arm, all the way from the wound to the loins, with vessels in it the size of one's finger, and divers abscesses full of black, sanious, fetid matter; the kidney, haunch, and thigh of the same side containing fistulous ulcerations; the bladder having the appearance of scirrhus; in fine, all the surrounding parts participating more or less in the disorganization.

Scirrhus and champignon constitute a grave, often indeed a mortal, affection. Among the numerous and inappreciable causes for it, the principal are those occasioning inflammatory irritation. It is generally believed that placing the clams upon the epididymis, or not immediately above it, may produce it. Let not the fear of drawing down the testicle induce us to place the clams close upon it, where the compression must be incomplete; on the other hand, let us not place the clams unreasonably high up, lest the cord become dragged by the expansion of the belly. Aged horses are more liable than colts to champignon; and stallions more than stone-horses who have never had mares. Lastly, champignon may result from the cord being diseased prior to the operation.

TREATMENT OF CHAMPIGNON.—In robust and healthy subjects, champignon and scirrhus often become dissipated by a profuse suppuration; in which case the swelling disappears in from six to twelve months. Fomentations, dressings, and exercise, promote this favourable termination. When there is no prospect of resolution in this manner, amputation and ligature are offered for our notice. It has been proposed to cut or burn off champignons while the cord continues in a swollen and painful condition; but from this gangrene may result. Nevertheless, Gillet, Bezier, Robert, Poincelot, and Mathieu, have amputated tumours of great volume with success. In our opinion, amputation is only applicable to champignons of small size, with narrow bases and lower surfaces spreading over the borders of the scrotal wound, and with cords but little enlarged. For the operation, the horse is to be secured the same as for castration; the external wound is then to be dilated by incisions in front and behind; the base of the champignon to be isolated by dissection; and fluted clams, containing, if it be thought necessary, some bichloride of mercury, applied. On the second or third day the clams may be removed, and the cham-

pignon cut off without fear of hæmorrhage. In other cases ligature is to be preferred. Indeed, providing there be not evident objections to its use, it may be considered our general remedy. One would not think of applying ligature in a case where the spermatic cord was swollen all the way up to the ring, or of carrying a ligature so high up as that, even supposing there the swelling terminated; and yet in such a case as this, unless the cord be divided at the ring, the disease is almost certain to return, and probably in a worse form. We must take care that our remedy prove not worse than the disease. Ligature, in point of fact, is applicable only in those cases in which it can be carried above the place of enlargement of the cord; and inapplicable in such as have the enlargement extending beyond the ring, too high to be surmounted by it, with enormous tumefaction upwards: here, ligature must necessarily include the scirrhus substance itself, the portion of which still remaining above it will rapidly augment and cause death. And when the base of the champignon has acquired a certain volume, the spermatic vessels are found to have become greatly enlarged also, rendering hæmorrhage almost certain to happen, indeed almost inevitable.

LIGATURE, supposing it to be practicable and advisable, is still not to be used until inflammation has been subdued, nor without some preparation of the patient. The horse being secured as for castration, an incision is to be made across the middle of the lower surface of the tumour, from one extremity to the other, in such manner as to destroy, as much as possible, any surrounding adhesions the cord may have contracted, without wounding its vessels: this will enable us to get at the neck of the tumour, around which is to be fastened our ligature, tight enough to interrupt the circulation. Over this is to be placed a second ligature, furnished with a slip-knot, with its end brought out and so placed that it may be tightened after suppuration has commenced. Some veterinarians who have been desirous to employ clamps in these cases, have had *curved* clamps made. Chabert directs us to have a leaden ring made for the cord, which can be contracted at pleasure. Mathieu uses a sort of pincers of his own invention, or else a ligature so disposed that it acts only upon the bloodvessels.

IN THE TREATMENT OF SCIRRHUS, when once it has extended along the cord, as high, perhaps, as the loins, quite out of the reach of being surmounted by ligature—a fact that may be ascertained by manual examination *per rectum*—and that the cord itself is indurated, and increases in volume upwards, and has contracted adhesions with the surrounding parts, and is likely to degenerate into a cancerous mass, reaching from the scrotum to the loins, other means must be sought: one resource is left us—that of piercing or boring the cord with a red-hot iron, of sufficient length, and straight, and about the diameter of the finger. The scirrhus cord is to be drawn forth to the extent that it will bear by an assistant, who at the same time diverges the lips of the wound, while the operator plunges the cautery into the scirrhus, and thrusts it longitudinally through it: he may likewise cauterize its sides both within and without the scrotum, the object being to induce a suppurative process which may consume it. From time to time, afterwards, the eschars and concretions of matter will require removal, and the parts cleansing.

AT THE TOULOUSE VETERINARY SCHOOL, an enormous champignon, the consequence of castration, of about three months' standing, was cured by caustic. The horse was in the state of exhaustion and marasm afore described. Ligature was attempted, but slipped off from not being got high enough. Several different times it was tried to plunge an iron white-hot into the cord, previously denuded of its softer parts by means of a section of elder-wood, which served as a director; but it destroyed only some softer portions, and there was apprehension of inflammation ensuing. Profiting by the cavity that was made by the cautery, we introduced into it a piece of caustic potash, and confined it with a plug of tow: surrounding the cord with tow besides, to protect it against any caustic droppings, the tow being confined by sutures. The animal was kept upon his back for a quarter of an hour, which was deemed requisite to give the caustic time to combine with the tissues. Three days afterwards an abundant suppuration brought away the plugs of tow. Reduction of the enlarged cord followed, and suppuration ended; but for a year and a half afterwards, working and living well all the while, the horse continued very thin. Nothing could be felt along the cord.

FISTULA OF THE SCROTUM, having cicatrized or inverted edges and discharging an ill-conditioned purulent matter, now and then accompanies the enlargement of the cord. In other cases abscess

forms, which should be opened the moment it points, since such has been known to open inwards and destroy life.

The following case shews to what enormity of bulk, neglected scirrhus of the cord, and spread of the disease to the scrotum and sheath, may in time give rise.

Mr. Megginis, V.S., Horsham, sent a tumour for examination to the Veterinary College weighing 29 lbs., which, during life, swung between the horse's thighs from side to side, like a cow's udder; and yet, large as it was, it did not interfere with the act of staling. The horse was destroyed on account of it in his fourteenth year. Mr. M. knew him when but three years old, "at which time he had the appearance of being a rig, but there was always a discharge from the scrotum. For some time the enlargement was not greater than an egg; it then increased to the size of a cricket-ball." After four years more, "being better fed and not so much worked, the swelling began gradually to increase; but it did not affect his health, he being regularly hunted."—"The wound would occasionally cease discharging for a few days, and then break out in a fresh place; and so it continued up to the time the horse was killed." "Lately, he began to lose his cheerful look and condition, and to be rather tucked up, and to lose flesh," and, finally, to be in pain; on which account his owner had him killed.

GANGRENE may be the consequence of excessive tumefaction of the sheath or of scirrhus of the cord, or may supervene upon peritonitis.

TETANUS may ensue either before or after the period of suppuration; arising, probably, from the compression upon the nerve being insufficient to annihilate sensation. Certain irritable horses are most liable, and it has been observed to occur oftener in summer than in winter: peritonitis being most common in winter. In both cases, however, the causes may be the same. Tetanus may result from a current of cold air interrupting the suppurative process and occasioning metastasis. One obvious indication of cure will be to re-establish suppuration.

AMAUROSIS occurred on the fourth day after the operation, in a horse three years old, under D'Arboval's observation, who had passed the night embedded in mud, in a ditch: but it disappeared after continuing six days. Another horse, four years old, turned out into low pasturage and lying out, became amaurotic next morning: he was taken into the stable, and eight days afterwards had

recovered. Fromage de Feugré has likewise observed amaurosis follow castration, which was attended by hæmorrhage of the cord: it also terminated favourably. But the most striking case of this kind is one Gohier relates.

A horse, in his sixth year, had, after being cut a month, a champignon as large as an egg. Gohier laid open the scrotum deeply, and placed above the induration well-closed clams. A small stream of blood issued from the wound, which at first was disregarded; but half-an-hour afterwards, perceiving that the hæmorrhage continued, the horse was led into a river, and allowed to remain therein for half-an-hour, up to his belly in water. The bleeding stopped, and Gohier left him; but on his return, he found that a great deal of blood had been lost, that the pulse was very small, and that vision was extinguished, owing to an extreme dilatation of both pupils. Gohier applied some agaric powder to the vessels, and plugged the wound with tow, which he confined by sutures. The bleeding ceased, but left the animal in extreme weakness for thirty-six hours; during which cordials were administered. By degrees he recovered, and about the fifteenth day his strength returned: the pupils, however, continued still in a state of dilatation, and vision remained very defective. For four months he was kept under observation, remaining in *statu quo*: afterwards he went to work in a cart, and at the end of a year died of colic.

STRANGLES, or something akin to it, has proved a sequel—I do not say a consequence—of castration, as the subjoined case will shew: it must, I take it, have existed in the system beforehand.

Mr. Lee, V.S., Sleaford, was called to a blood-colt, who immediately after being cut had been “attacked with strangles, accompanied by ulceration of the scrotum and general cedema and debility.” The pulse was 60; the appetite gone; the penis and scrotum much swollen. Fever and diuretic medicine, and opening and fomenting the scrotum, to appearance recovered him. On the eighth day he again lost his appetite, and a large tumour appeared forming on the inside of the thigh, near the scrotum. Two days afterwards, Mr. L. opened the tumour, and discharged upwards of two quarts of pus, “which flowed through the abdominal ring.” The colt regained his appetite, and in a few days quite recovered.

FARCY AND GLANDERS followed castration in the case annexed:—

In May, 1823, a three-year-old colt, the property of Mr. L., of Eltham, was cut in the ordinary manner, with the actual cautery, by my father. On the

seventh day afterwards some pimples, perceptible only to the feel, were discovered upon the outer side of the near quarter, forming by their course a connected chain. These grew in size and assumed the appearance of farcy buds. And what increased our suspicion was, that the colt halted with the limb. On the tenth day, similar pimples appeared upon the opposite hind and upon both fore legs, and likewise upon the head and neck. All the limbs then took to swell; but most of all the off hind, to which the lameness became transferred. Soon after he commenced emitting purulent matter from the nostrils. Fever had been all along an accompaniment. On the twenty-sixth day from that of the operation he was destroyed, suffering in the last stage of farcy coupled with the supervention of glanders.







